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Risk Assessment, Management, Communication A Guide to Selected Sources

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Washington, DC

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This guide directs the reader to a wide spectrum of sources of information which address the basic and fundamental principles and issues of risk assessment, risk management, and risk communication. It is designed to assist EPA, other Federal, State and local governmental agencies, and the private sector in locating and building on existing knowledge of risk. It identifies experts and organizations within and outside EPA who are involved in the areas of risk assessment, management and communication. The guide also includes a section on other sources of information such as bibliographies, organizations, meetings and conferences, and course work that support risk research and education. The Appendices list EPA Regional risk coordinators, EPA libraries, and computerized databases that were searched in preparing this Guide. Subject areas excluded from this guide are hazardous waste, specific chemical risks and abatement technology.

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Office of Toxic Substances
Washington DC 20460

March 1987
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EPA

Risk Assessment, Management, Communication

A Guide to Selected Sources

ASSESSMENT
MANAGEMENT
COMMUNICATION
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Risk Assessment, Management, Communication

A Guide to Selected Sources

ASSESSMENT
MANAGEMENT
COMMUNICATION

Office of Information
Resources Management
and
Office of Toxic Substances

March 1987

FOREWORD

The mission of the Environmental Protection Agency is the protection of public health and the environment through adequate management of adverse risk. To accomplish this effectively we must keep abreast of the continually expanding literature on risk assessment, risk management, and risk communication. I believe this document with its wealth of sources and its periodic updates contributes significantly to this objective.

Jim Barnes

A. James Barnes
Deputy Administrator
U.S. Environmental Protection Agency

ACKNOWLEDGMENTS

The cooperation and interest of many at EPA have made this Guide of risk information. It is the result of those who generously shared with us their ideas and gave their time to this extensive effort to collect a spectrum of material of potentially wide appeal.

We express our thanks and appreciation to everyone in and outside of EPA who contributed to this project. We are especially indebted to the following:

Loretta A. Marzetti, Office of Information Resources Management, who sensed the need for this Guide, for her direction, encouragement, and enthusiasm throughout.

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Resources Management

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If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties.

-- Francis Bacon

CONTENTS

FOREWORD.......... iii

ACKNOWLEDGMENTS.......... v

INTRODUCTION.......... 1

RISK·ASSESSMENT.......... 5
  - General Perspective.......... 7
  - Assessment Guidelines.......... 17
  - Quantitative Risk Assessment and Pharmacokinetics.......... 21
  - Methods of Estimating and Measuring Risk.......... 33
  - Health Risks.......... 47
    - General.......... 47
    - Cancer.......... 51
    - Genotoxicity and Reproductive Effects.......... 59
    - Neurotoxicity.......... 89
  - Ecological Risks.......... 93
  - Corporate Risk Assessment.......... 99
  - Policy.......... 101
  - Legal Aspects.......... 103
  - Uses of Risk Assessment.......... 105
  - Bibliographies and Other Sources.......... 111
  - EPA Information Systems Inventory.......... 115
    - Office of Pesticide Programs.......... 117
    - Office of Radiation Programs.......... 121
    - Office of Research and Development.......... 128
    - Office of Toxic Substances.......... 130

RISK MANAGEMENT.......... 133
  - General Perspective.......... 135
  - Policy.......... 153
  - Legal Aspects.......... 161
  - Health Risks.......... 165
  - Economic Analysis.......... 169
  - Corporate Risk Management.......... 171
  - Bibliographies and Other Sources.......... 173

RISK COMMUNICATION.......... 175
  - Informing the Decision-Maker.......... 177
  - Informing the Public.......... 179
  - Informing the Worker.......... 185

OTHER SOURCES.......... 191
  - Organizations.......... 193
  - Meetings and Conferences.......... 197
  - Education.......... 199

Preceding page blank

APPENDIX A.. 201

EPA Regional Network for Risk Assessment/........ 203
Risk Management

APPENDIX B.. 205

EPA Libraries.. 207

APPENDIX C.. 219

Databases Searched.. 217

This Guide has been prepared and reviewed by the U.S. Environmental Protection Agency (EPA). Due to the rapidly expanding field of risk information, EPA cannot guarantee that all relevant sources are cited. Publication does not signify that the contents reflect the views of EPA or that EPA endorses the coverage and scope of the subject matter as comprehensive, complete, and appropriate.

INTRODUCTION

The mission of the U.S. Environmental Protection Agency (EPA) is to protect public health and the environment from unreasonable risk. This is attained through regulatory actions that involve the complex processes of risk assessment, risk management, and risk communication.

EPA has adopted many of the regulatory goals for risk assessment and risk management that were clarified in 1983 by the National Academy of Sciences in **Risk Assessment in the Federal Government: Managing the Process**. The increasing importance and use of risk assessment as the basis for regulatory decisions is largely responsible for the rapid expansion of information on risk.

This Guide directs the reader to a wide spectrum of sources of information which addresses the basic and fundamental principles and issues of risk assessment, risk management, and risk communication. Other related sources are also cited. The Guide is designed to assist EPA, other Federal, State, and local government agencies, and the private sector in locating and building on existing knowledge of risk. It also serves to identify experts and organizations within and outside EPA who are involved in the areas of risk assessment, management, and communication.

General Perspective

The Guide is intended to assist the reader in selecting material of interest to expand his or her knowledge and understanding of basic and important issues related to environmental risk. Broad coverage is given to the subject and includes areas such as policy, principle, theory, practice, research, methodology, and problems created by scientific uncertainty and false perceptions. In addition, basic and fundamental studies from other fields, such as the behavioral sciences and pharmacology are included. These areas have potential applicability to an increased understanding of the principles underlying risk assessment and management at the EPA.

The Guide also includes a section on other sources of information such as bibliographies, organizations, meetings and conferences, and course work that support risk research and education. The Appendixes list EPA Regional risk coordinators, EPA libraries, and computerized databases that were searched in preparing this Guide.

Subject areas excluded from this Guide are: (1) hazardous waste (The EPA Library's Hazardous Waste Collection and Database," a PC-based software system, adequately covers this specific source of risk. It is cited in the section on Risk Assessment: Bibliographies and Other Sources); (2) risks associated with specific chemicals except when the chemical is used to illustrate a principle; and (3) abatement technology.

The information included in the Guide was obtained from:

- scientific and technical papers and reports resulting from EPA support of research and development
- books, reports, conference proceedings
- journal articles from commercial databases covering the last 10 years (Appendix C)
- the **EPA Information Systems Inventory** of databases and modeling systems
- the **EPA Catalog of Library Holdings.**

How To Use The Guide

The Contents page illustrates the organization and content of the material. Occasionally there are definitions and scope notes added at the beginning of each section and subsection to help further delineate the contents.

Bibliographic references are arranged alphabetically by title within each topical area. Many of the references cited address topics beyond those in the subsection in which they have been listed. For example, the subsections of "Legal Aspects" and "Policy" in the "Risk Management" section contain overlapping discussions. Likewise, the subsections of the Risk Assessment section also contain overlapping material. While references were placed in subsections which appeared to be given the most weight, the reader is encouraged to examine other possibly related subsections. Most of the cited references have an abstract. All abstracts are supplied by the author. Each entry includes at least: title, author, source, and date of publication. In addition, the author's affiliation, sponsoring and performing organization, keywords, report number, book call number, and EPA library location may also be present.

Bibliographic citations, retrieved from computerized files are accompanied by a code for the file from which they were retrieved. For example, the Dialog information system contains a database called Enviroline which is coded "ENVL". Electronically accessed citations contained in the Guide include the information and basic format provided by the database service and the code that is added to identify the database source.

How To Obtain Cited Documents

The EPA network of libraries can assist EPA staff in obtaining documents from its collection of materials or that of another library's through interlibrary loan. Each cited reference includes sufficient information for the librarian or reader to easily locate the document in a library or from a publisher or distributor.

The double asterisk (**) before the title indicates that the document is in the EPA library system. However, because the libraries continually add to their collections, it is advisable to search the local index or to consult the librarian for all documents you wish to read.

Supplements To The Guide

The last ten years of the literature have been surveyed inclusive of the September 1986 update for databases that were searched. To keep up with changes and new developments in this dynamic area, the Headquarters Library will produce a quarterly current awareness bulletin to supplement the Guide. It will highlight newly published and retrospective literature, as well as meetings, conferences, courses, and workshops.

If you would like to share documents and other sources of risk information with our readers, please send these to:

EPA HQ Library - PM-211A
Risk Update
401 M Street, S.W.
Washington, D.C. 20460

RISK ASSESSMENT

. . . . IS THE SCIENTIFIC PROCESS THAT EVALUATES THE POTENTIAL FOR OCCURRENCE OF ADVERSE EFFECT.

General Perspective 7
Assessment Guidelines 17
Quantitative Risk Assessment and Pharmacokinetics 21
Methods of Estimating and Measuring Risk 33
Health Risks 47
    General 47
    Cancer 51
    Genotoxicity and Reproductive Effects 59
    Neurotoxicity 89
Ecological Risks 93
Corporate Risk Assessment 99
Policy 101
Legal Aspects 103
Uses of Risk Assessment 105
Bibliographies and Other Sources 111
EPA Information Systems Inventory 115
    Office of Pesticide Programs 117
    Office of Radiation Programs 121
    Office of Research and Development 128
    Office of Toxic Substances 130

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GENERAL PERSPECTIVE .... *includes cross-media approach, de minimis risk, and uncertainty in assessment.*

Analysis of Actual Versus Perceived Risks
Proceedings of the Society for Risk Analysis. Volume 1
Covello, Vincent T., National Science Foundation; Flamm, W. Gary, Food and Drug Administration; Rodricks, Joseph V., Environ Corp.; Tardiff, Robert G., National Academy of Sciences (eds.)
Corporate Source: Society for Risk Analysis
New York, Plenum, 1986
388p., illustrated, 0-306-41397-3
Type Document: Series: Society for Risk Analysis, Volume 1
Keywords: Risk Analysis; Comparative Study; Estimation Methodology; Actual Versus Perceived
Research has shown that technical experts and nonexperts differ substantially in their risk estimates of health, safety, and the environment. Risk estimates by technical experts are more closely aligned with annual fatality rates than estimates by nonexperts. The contributors to this volume clarify the issue by presenting selected cases that represent some of the most important aspects and dimensions of risk: voluntary vs. involuntary; low vs. high probability of occurrence, exposure, and effects; and high vs. low health, safety, or environmental consequences.
Source of Abstract: Publisher

****Anatomy of Risk**
Rowe, William D.
New York, Wiley, 1977
Type Document: Series: Wiley series on systems engineering and analysis
Keywords: Technology Assessment; Risk; Decision-Making
Call Number: T174.5.R68
EPA Libraries: EHA R1; EIA R2; EJB HQ; EJE OTS; EKB RTP; EKD Athens; ELB Cinc; EOA R8; ERA R9; ERB Las Vegas; ESB Corv

****Assessment and Management of Chemical Risks**
Based on a Symposium Sponsored by the Division of Chemical Health and Safety at the 184th Meeting of the American Chemical Society, Kansas City, Missouri, Spetember 12-17, 1982
Rodricks, Joseph V.; Tardiff, Robert G.
Washington, DC, American Chemical Society, 1984
Type Document: Series: American Chemical Society Symposium Series 239
Keywords: Animal Toxicity; Epidemiology; Chemical Safety sessment; Dose-Response Evaluation; Human Exposure Assessment; Methodologies of Risk Assessment; Decision-Making; Risk Management
Call Number: RA 1199.A77.1984
EPA Libraries: EJB HQ; EIA R2; EJE OTS; ELA R5; ELB Cinn; ELD Duluth

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****Background Information Document: (Integrated Risk Assessment): Final Rules for Radionuclides**
Variant Title: Radionuclides, Background Information Document for Final Rules
Corporate Source: U.S. Environmental Protection Agency. Office of Radiation Programs.
PEI Associates Washington, DC. U.S. Environmental Protection Agency, Office of Radiation Programs, 1984.
2 v.:Ill., maps; 28 cm.
Keywords: Radioisotopes-Environmental aspects -United States; Radioactive pollution-United States
(GPO)

****Chemical Risk: A Primer**
ACS Report, Dec 84 (12) Assn Report
Chemical Risk Assessment is defined as an attempt to identify in a qualitative sense, and then to quantify scientifically the risk associated with a given exposure. A distinction is made between risk assessment and risk management. Major components of risk assessment include chemical structure, solubility bioaccumulation, and transformation. Toxicity estimation techniques include clinical, epidemiological, animal, and test tube studies. Uncertainties inherent in testing schemes and in estimating chemical exposure are appraised. (1 Diagram, 1 Graph) (ENVL)

****Elements of Risk Assessment**
Goldstein, Bernard
U.S. EPA, Washington, DC, EPA 1985
Note: Risk Assessment Conference, March 18, 1985
EPA Libraries: EJB HQ
Call Number: EPAX 8602-0014

****Environmental Risk Analysis for Chemicals**
Conway, Richard A.
New York: Van Nostrand Reinhold, 1982, 558pp
ISBN 0-442-21650-5
(ENVL)

****Environmental Risk Assessment**
Whyte, Anne V.; Burton, Ian (eds)
New York: John Wiley and Sons, 1980 159pp
ISBN 0-471-27701-0
(ENVL)

****Fundamentals of Risk and Insurance. 2nd Ed.**
Waughan, Emmett J.; Elliott, Curtis Miller
Santa Barbara, Wiley, 1978
Type Document: Series: Wiley-Hamilton Series in Risk and Insurance
Keywords: Risk (Insurance)
Call Number: HG 8051.E478 1978
EPA Libraries: EKA R4

****Hazard Assessment Philosophy: A Regulatory Viewpoint**
Akerman, James W.; Coppage, David L.
EPA
Presented at American Fisheries Society Analyzing the Hazard Evaluation Process Conf, New Hampshire, Aug 14-18, 78, P68 (6) Technical report: Provisions of the Federal Insecticide, Fungicide, and Rodenticide Act of 1972 contain guidelines for the registration and hazard evaluation of chemical substances. Information on pesticide use and aquatic toxicity is needed to evaluate nontarget hazards. Basic required tests include a 96 HR LC50 for one coldwater and one warmwater fish species. A 96 HR LC50 for shrimp and crab species, and embryo-Larvae lifecycle tests. (1 Reference, 2 Tables) (ENVL)

****Managing Environmental Risks**
Alm, A
The Environmental Forum 4(1):12-14; 1985
HMTC Risk assessment is an important tool for setting environmental control priorities because it estimates potential substance toxicity with human exposure to obtain a risk level. Environmental control priorities, however, are currently based on specific legislation rather than risk assessment, causing unnecessary health risks and wasted efforts on the part of EPA. For example, instead of placing a high priority on radiation posing the greatest health risk, Federal regulation has given priority to radiation causing little risk. In turn, EPA addressed the legislation dealing with the low risk radiation and did not address high risk radiation. Risk assessment estimates need to be used in the legislative process, and analytical tools need to be continually developed to provide guidance on regulatory decisions. (NLM)

****Measurement of De Minimis Risk**
(Final rept.)
Chmelynski, H. J.; Lehrman, D.; Goldin, D.; Beal, S.
Faucett (Jack) Associates, Inc., Chevy Chase, MD
Sponsor: Cohen (S.) and Associates, McLean, VA; Office of Radiation Programs, Washington, DC
Report No.: JACKFAU-84-311-3 Apr 85 124p
Prepared in cooperation with Cohen (S.) and Associates, McLean, VA
Contract No.: EPA-68-02-3853
PB85-197325/XAB
This study attempts to determine the existence of 'de facto de minimis' threshold as it is revealed by examining government activity with respect to low-level risks that are

clearly visible and accurately measured. The study was restricted to the examination of government activity because society's concerns are reflected in risk-management decisions made by the government sector. Risk which are accepted by individuals because of the associated benefits derived from accepting the risk were considered poor candidate for revealing the current level of 'de minimis.' This effectively eliminated from consideration most occupational risks, which are often accepted based on cost-benefit criteria. (NTIS)

****No-Risk Society**
Aharoni, Yair
Chatham, NJ, Chatham House, 1981
Type Document Series: Chatham House Series on Change in American Politics
Keywords: Social Security; Welfare State; Risk; Insurance
Call Number: HD7091.A4
EPA Libraries: EJB HQ

Perceiving Environmental Quality. Research and Applications
Craik, Kenneth H., Univ of California at Berkeley;
Zube, Ervin H., Univ of Massachusetts (eds.)
New York, Plenum, 1986
324 p, illustrated 0-306-36309-7
Type Document: Series: Environmental Science Research, Vol.9
Keywords: Risk Assessment Methodologies

Contributors from several fields discuss research needs and methodological issues in assessing various environments-- residential and institutional, scenic and recreational, air, water and sound. Research strategies are suggested.... This book should remain a useful reference for several years.

Source of Abstract: Perceptual and Motor Skills

****Pollution Abatement Resulting in Cross Media Impacts: Radiation**
Schoen A
AEC
Presented at EPA Poll Control Tech Assessment Conf,
Columbus, OH, May 1-3, 74, p 47 (3)

Survey report: While in most environmental legislation one form of media is considered without the commensurate concern for the impact of stresses imposed on other media, the nature of atomic energy legislation deals with the total technology and the total concept of control and regulation. All media and all sources of environmental impact are considered equally, and regulations apply to the entire developing technology. (ENVL)

Problems in Making Decisions About Hazard

Hayward, GM
Cambridge Univ. (England). Dept. of Engineering
Report No.: CUED/F-CAMS/TR-209-1981
1981 53p
Also pub. as ISSN-0309-765X
Country of Publication: United Kingdom
PB82-114497

Widespread concern is frequently expressed about the public management of hazards. It is argued here that this arises from severe problems of assessment, of acceptability and of government decision-making. These problems are discussed and approaches to handling them are proposed. It is argued that hazards should be assessed by multiple dimensions of severity and that acceptability should depend on the balance between the assessed hazard and all other costs and benefits of an activity and of the alternative options, but that the 'natural' approach to decision making by government bodies is to try to establish norms for each factor separately. It is suggested that the political processes of public hazard management could be improved by using formal decision-aiding methods, of which Decision Analysis appears to be currently the most suitable. (NTIS)

Research Needs for Dealing with Uncertainty in Risk Analysis
(Final report)

Little (Arthur D.), Inc, Cambridge, MA
Sponsor: National Science Foundation, Washington, DC. Div. of Policy Research and Analysis
Report No.: NSF/PRA-83043 Sep 83 74p
Contract Number: NSF-PRA84-40855
Type Document: Conference Proceeding
PB84-150127

Discussions are summarized from the workshop held to: (1) identify major generic problems of uncertainty in the risk analysis process; (2) summarize methods and approaches that could be used to deal with these problems; and (3) suggest areas and topics warranting further research to address those problems that are not adequately treated by existing methods. The workshop format is described and participants are listed. Thirteen areas warranting further research are identified: (1) estimation of low probabilities; (2) dealing with model uncertainty; (3) representation of uncertainty; (4) description of risks and behaviors; (5) responses to rare events; (6) data collection strategies; (7) resource allocation to hazards; (8) use of experts in risk analysis; (9) role of incentives in risk management; (10) ethics for imposition; (11) retrospective review of risk studies; (12) long-range risk analysis; and (13) natural experiments. These research topics are ranked and compared in terms of both importance and feasibility. (NTIS)

****Risk Analysis and Decision Processes: The Siting of Energy Gas Facilities in Four Countries**
Kunreuther, Howard; Linnerooth, Joanne
Corporate Source: International Institute for Applied Systems Analysis
New York, Springer-Verlag, 1983
Keywords: Liquified Natural Gas Industry; Decision Making; Case studies; Liquified Petroleum Gas Industry; Risk
Call Number: HD9581.2.L572K86 1983
EPA Libraries: EJA R3; ERA R9

****Risk Analysis Controversy: An Institutional Perspective:**
Proceedings of a Summer Study on Decision Processes and Institutional Aspects of Risk Held at IIASA, Laxenburg, Austria, 22-26 June 1981
Kunreuther, Howard; Ley, Eryl V.
Corporate Source: International Institute for Applied Systems Analysis
New York, Springer-Verlag, 1982
Keywords: Technology Assessment; Risk
Call Number: T174.5.R554 1982
EPA Libraries: EKE OAQPS-RTP

****Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers**
Douglas, Mary; Wildovsky, Aaron B.
Berkely, Univ. of California Press, 1982
Type Document: Book
Keywords: Risk; Culture
Call Number: H91.D68 1982
EPA Libraries: EJA R3; EJB HQ; ERA R9

****Risk Assessment**
Mechanical Engineering 106: 21-59, Nov 84
Bibliography, Flow Diagram, Illustrated Diagram
Source: Applied Science and Technology Index, 1985

Risk Assessment and Environmental Benefits Analysis
Runge, Carlisle F.
Univ of Minnesota
Natural Resources J., Jul 83, V23, N3, P683 (14)
Although cost-benefit analysis is widely used to weigh environmental policy alternatives, it faces two types of uncertainty: regulatory and scientific. The former

involves the absence of information concerning the supply of and demand for a given level of quality, while the latter involves a lack of data on thresholds defining health standards. The shortcomings of cost-benefit analysis are illustrated by its use in the Clean Air Act of 1977. (32 references). (ENVL)

****Risk Assessment as a Subjunctive Process**
(Paper presented at the 44th Military Operations Research Symposium at Vandenberg AFB, Dec 5, 1979)
Strauch, Ralph E.
Santa Monica, CA, Rand Corp, 1980
Type Document: Conference paper
Keywords: Decision Making; Risk
Call Number: HD30.23.58x
EPA Libraries: EKE OAQPS-RTP

****Risk Assessment of Environmental Hazard**
Kates, Robert William; Clark Univ.
Corporate Source: Scientific Committee on Problems of the Environment (Scope)
New York, J. Wiley, 1978
Type Document: Series: Scope Report: 8
Keywords: Environmental Health; Environmental Monitoring
Intl Council Scientific Unions Report, 1978 (132)

Special report: The state of the art of coping with environmental risks was examined, and the process of environmental risk assessment was explored. Risk assessment is a small but essential part of the process of coping with environmental hazard. A risk assessment methodology was detailed, including hazard identification techniques and theory, risk estimation methods and theory, and social evaluations of risks through cost benefit and other techniques. Trends and attitudes in the scientific research, media, public opinion, and statistical evaluation of environmental risk assessment were detailed. A case study showing three views of a nuclear reactor safety study was explored. (17 Graphs,Numerous References, 18 Tables)

Call Number: RA566.K37
EPA Libraries: EIA R2; EJE OTS; EKB RTP; EKC GBreeze; EKD Athens; ELB Cinn; ESB Corv

****Risk in the Technological Society**
Hahenemser, Christoph; Kasperson, Jeanne X.
Corporate Source: American Association for the Advancement of Science
Boulder, Colo, Westview Press, 1981
Keywords: Technology Assessment; Risk

Based on a symposium which was held at the 1980 American Association for the Advancement of Science National Annual meeting in San Francisco, California, January 3-8

Call Number: T174.5.R57
EPA Libraries: EHA R1; EJE OTS

****Risk: Man Made Hazards to Man**

Cooper, MG
Oxford, Clarendon Press, 1985
Type Document: Series: Wolfson College Lectures: 1984 Keywords: Environmental Health -- Addressess, essays, lectures; Health Risk Assessment; Toxicology; Hazardous Substances
Call Number: RA566.R57 1985
EPA Libraries: EJA R3

****Societal Risk Assessment: How Safe is Safe Enough?**

Schwing, Richard C.; Albers, Walter A.
General Motors Corp. Research Labs
New York, Plenum Press, 1980
Type Cocument: Proceedings
Keywords: Technology Assessment; Risk
Notes: Proceedings of an International Symposium held Oct 8-9, 1979 at the General Motors Research Labs, Warren, Michigan and sponsored by the Labs.
EPA Libraries: EKB RTP; ELB Cinn
Call Number: T174.5.56

****State of the Environment: An Assessment at Mid-Decade (Controlling Cross-Media Pollutants)**

Conservation Foundation Report, 1984, p 319 (46)
Pollutants can move from one medium to another, causing damage in each. Federal statutes and programs are designed to control pollutants as if they remain in the same medium. This narrow focus can undermine the effectiveness of environmental laws. A cross-media approach to pollutant control has four dimensions paralleling the stages of pollution control: release from a source, waste management, cycling in the environment, and exposure of people and ecosystems. The need to control toxics that move among media is encouraging a more integrated approach to environmental management. Policy focus must shift from limiting releases into a single medium to reducing risk from a source, pollutant, or geographic area. Controls would encourage changing products or processes, and segregating or recycling wastes. (4 Diagrams, 1 Graph) (ENVL)

****State of the Environment: An Assessment at Mid-Decade (Risk Assessment and Risk Control)**

Conservation Foundation Report, 1984, P261 (57)
Environmental managers are presently emphasizing risk assessment, the process of determining adverse consequences from the use of a technology or some other action. Hazard occurrence probability is estimated, and types of hazards posed are defined. Almost all such assessments are plagued by inadequate data. Adequate toxicity data are not available for the majority of chemicals now in use. As a result, analysts often do not know whether taking regulatory action on a chemical will increase or reduce risk. This lack of exposure and hazard data influences policy, as many policy decisions must be based on assumptions. (2 Diagrams, 1 Graph, 2 Tables) (ENVL)

****Technological Risk Assessment**
Ricci, Paolo F.; Sagan, Leonard A; Whipple, Chris
The Hague, Boston, M. Nijhoff, 1984
Type Document: Series: NATO ASI Series, Series E, Applied Sciences, No. 81
Keywords: Technology Assessment; Health Risk Assessment; Bibliography
Proceedings of the NATO Advanced Study Institute of Technology Risk Assessment, ERICE, Sicily, Italy, May 20-31, 1981
Call Number: T174.5.N37 1981
EPA Libraries: ELB Cinc.

****Toxic Materials Risk Assessment: A Practical Guide**
Camougis, G.
Pollution Engineering 17:50-7, Aug 85
Diagram
Source: Applied Science and Technology Index, 1985

****Toxicity Testing: Strategies to Determine Needs and Priorities**
National Research Council
Washington, DC, National Academy Press, 1984, 382 pp.

****The 1985 Washington Conference on Environmental and Health Risk Assessment**
Co-sponsored by Inside EPA Weekly Report and The Center for Energy and Environmental Management Oct 28-29, 1985,
Radisson Mark Plaza Hotel, Alexandria, VA
Notes: Areas of discussion include EPA risk assessment guidelines, Office of Science and Technology Policy initiatives, ecological risk assessment, Food and Drug Administration risk assessment, assessing exposure risks, Research, industry risk assessments, hazardous wastes, report on the Kanawha Task Force, communicating risk.
EPA Libraries: EJB HQ

ASSESSMENT GUIDELINES

****Department of Health and Human Services. National Institutes of Health, Guidelines for Research Involving Recombinant DNA Molecules**
Federal Register Vol. 51, No. 88, May 7, 1986
p.16958-16985

****Environmental Protection Agency. Guidelines for Carcinogen Risk Assessment Final**
Federal Register, Vol. 51, No. 185, Sep 24, 1986,
p.33992-34003 References: 29

****Environmental Protection Agency Proposed Guidelines for Carcinogen Risk Assessment; Request for Comments**
Federal Register, Vol.49, No. 227, Nov. 23, 1984
p.46294-46301

****Environmental Protection Agency. Guidelines for Estimating Exposures. Final**
Federal Register, Vol. 51, No. 185, Sep 24, 1986,
p.34042-34054

**** Environmental Protection Agency Proposed Guidelines for Exposure Assessment; Request for Comments**
Federal Register, Vol.49, No. 227, Nov. 23, 1984
p.46304-46312

****Environmental Protection Agency. Guidelines for the Health Assessment of Suspect Developmental Toxicants** Final.
Federal Register, Vol. 51, No. 185, Sep 24, 1986,
p.34028-34040. References: 69

****Environmental Protection Agency Proposed Guidelines for the Health Assessment of Suspect Developmental Toxicants and Request for Comments**
Federal Register, Vol.49, No. 227, Nov. 23, 1984 (FR)
p.46324-46331

Environmental Protection Agency. Guidelines for the Health Risk Assessment of Chemical Mixtures. Final.
Federal Register, Vol. 51, No. 185, Sep 24, 1986
p.34014-34025. References: 40

Preceding page blank

Protection Agency Proposed Guidelines for the Health Risk Assessment of Chemical Mixtures and Request for Comments; Notice
Federal Register, Vol.50, No. 6, Jan. 9, 1985
p.1170-1176

****Environmental Protection Agency. Guidelines for Mutagenicity Risk Assessment** Final.
Federal Register, Vol. 51, No. 185, Sep 24, 1986,
p.34006-34012 References: 21

****Environmental Protection Agency Proposed Guidelines for Mutagenicity Risk Assessment; Request for Comments**
Federal Register, Vol.49, No. 227, Nov. 23, 1984
p.46314-46321

****Environmental Protection Agency. Office of Pesticide Programs. Hazard Evaluation Division. Standard Evaluation Procedures:**

1. Honey Bee - Contact LD50
   PB86-154580/REB
   EPA 540/9-85-002
2. Honey Bee - Toxicity of Residues on Foliage
   PB86-129244/REB
   EPA 540 19-85-003
3. Wild Mammal Toxicity Test
   PB86-129251/REB
   EPA 540/9-85-004
4. Acute Toxicity Test for Freshwater Invertebrates
   PB86-129269/REB
5. Acute Toxicity Test for Freshwater Fish
   PB86-129277/REB
   EPA 540/9-85-006
6. Avian Single-Dose Oral LD50
   PB86-129285/REB
   EPA 540/9-85-007
7. Avian Dietary LC50 Test
   PB86-129293/REB
   EPA540/9-85-008
8. Acute Toxicity Test for Estuarine and Marine Organisms
   (Estuarine Fish 96-Hour Acute Toxicity Test)
   PB86-129301/REB
   EPA 540/9-85-009
9. Acute Toxicity Test for Estuarine and Marine Organisms
   (Shrimp 96-hour Acute Toxicity Test)
   PB86-129319/REB
   EPA 540/9-85-010

10. Acute Toxicity Test for Estuarine and Marine Organisms
    (Mollusc 96-hour Flow-Through Shell Deposition Study)
    PB86-129327/REB
    EPA 540/9-85-011
11. Acute Toxicity Test for Estuarine and Marine Organisms
    (Mollusc 48-hour Embryo Larvae Study)
    PB86-129335/REB
    EPA 540/9-85-012
12. Hydrolysis Studies
    PB86-129343/REB
    EPA 540/9-85-013
13. Aqueous Photolysis Studies
    PB86-129350/REB
    EPA 540/9-85-014
14. Aerobic Soil Metabolism Studies
    PB86-129368/REB
    EPA 540/9-85-015
15. Soil Photolysis Studies
    PB86-129376/REB
    EPA 540/9-85-016
16. Soil Column Leaching
    PB86-129384/REB
    EPA 540/9-85-017
17. Teratology Studies
    PB86-129392/REB
    EPA 540/9-85-018
18. Oncogenicity Potential (Guidance for Analysis and
    Evaluation of Long Term Rodent Studies)
    PB86-129400/REB
    EPA 540/9-85-019
19. Toxicity Potential (Guidance for Analysis and
    Evaluation of Subchronic and Chronic Exposure Studies)
    PB86-129418/REB
    EPA 540/9-85-020
20. Magnitude of the Residue: Crop Field Trials
    PB86-129426/REB
    EPA 540/9-85-021
21. Ecological Risk Assessment
    PB86-247657
    EPA 540/9-85-001

Note: These EPA guidance documents are used to evaluate pesticide registration data submitted to the Agency and are used in conjunction with the appropriate Pesticide Assessment and other Agency Guidelines.

****Environmental Protection Agency. Office of Pesticide Programs**
Hazard Evaluation Division. Pesticide Registration Guidelines
Subdivision D, **Product Chemistry**
EPA 540/9-82-018; NTIS PB83-153890

Subdivision E, **Hazard Evaluation: Wildlife & Aquatic Organisms**
EPA 540/9-82-024; NTIS No. PB83-153908
Subdivision E, **Addendum**
EPA 540/9-85-152; NTIS No. PB86-248176
Subdivision F, **Hazard Evaluation: Human & Domestic Animals**
EPA 540/9-82-025; NTIS No. PB83-153916
Subdivision F, **Revised**
EPA 540/9-84-014; NTIS No. PB86-108958
Subdivision F, **Addendum**
EPA 540/9-86-150; NTIS No. 86-248184
Subdivision G, **Product Performance**
EPA 540/9-82-026; NTIS PB83-153924
Subdivision H, **Labeling For Use**
EPA 540/9-82-000; (Not available from NTIS)
Subdivision I, **Experimental Use Permits**
EPA 540/9-82-022; NTIS No. PB83-153932
Subdivision J, Hazard Evaluation: **Nontarget Plants**
EPA 540/9-82-020; NTIS No. PB83-153940
Subdivision K, **Exposure: Reentry Protection**
EPA 540/9-84-001; NTIS No. PB85-120962
Subdivision L, Hazard Evaluation: **Nontarget Insects**
EPA 540/9-82-000; NTIS No. PB83-154957
Subdivision M, **Biorational Pesticides**
EPA 540/9-82-028; NTIS No. PB83-153965
Subdivision N, **Chemistry: Environmental Fate**
EPA 540/9-82-021; NTIS No. PB83-153973
Subdivision N , **Addendum**
EPA 540/9-86-149; NTIS No. PB86-247848
Subdivision O, **Residue Chemistry**
EPA 540/9-82-023; NTIS No. PB83-153981
Subdivision O, **Addendum 2**
EPA 540/9-86-151; NTIS No. PB86-248192
Subdivision O, **Supplement 1**
EPA 540/9-86-148; NTIS No. PB86-203734
Subdivision R, **Pesticide Spray Drift Evaluation**
EPA 540/9-84-002; NTIS No. PB84-189216
Subdivision U, **Applicator Exposure Monitoring**
EPA 540/9-87-127; NTIS No. PB87-133286

NTIS = National Technical Information Service, 703-487-4650

**Office of Science and Technology Policy. Chemical Carcinogens;
A Review of the Science and Its Associated Principles, February 1985.
Federal Register, Vol.50, No. 50, Mar. 14, 1985
p.10372-10442

QUANTITATIVE RISK ASSESSMENT AND PHARMACOKINETICS .... *includes clinical and physiological pharmacokinetics, drug metabolism, acceptable daily intake (ADI), quantitative structure-activity relationship (QSAR), dose-response relationship*

****Application of Metabolic and Excretion Kinetics to Problems of Industrial Toxicology**
Piotrowski, Jerzy
Washington, DC, U.S. Government Printing Office, 1971
Type Document: Book
Keywords: Industrial Toxicology; Mathematical Models; Biotransformation (metabolism); Pharmacokinetics
Call Number: RA1216.P56
EPA Libraries: EKB RTP RA1216.P52; ELB Cinn; ERB Las Vegas

****Applied Clinical Pharmacokinetics**
Mungall, Dennis R.
New York, Raven Press, 1983
Call Number: RM301.5.A655 1983
EPA Libraries: ELB Cinn

****Approaches to Quantitative Expression of Dose Response**
Gilbert, ES
Sponsoring Agency: Department of Energy, Washington, DC
NTIS/DE85013498, 16p
This paper discusses quantifying risks experienced by populations that have been exposed to relatively low levels of harmful agents or substances. 15 refs. (ERA citation 10:037824) Symposium on epidemiology and health risk assessment, Columbia, MD, USA, 14 May 1985. (NLM)

Biological Variation: The Unsolvable Problem in Quantitative Extrapolations from Laboratory Animals and Other Surrogate Systems to Human Populations
Gillett JR
Lab. of Chemical Pharmacology, Natl. Heart, Lung, and Blood Inst:, NIH, Bethesda, MD
Banbury Rep; 19:199-206 1985
The obvious objective of risk assessment is to estimate the rate of occurrence of a given biological response at any given dose of a given substance in the human population, or in the populations of other organisms in the environment. For many theoretical as well as practical reasons, however, this objective is virtually unattainable, even for compounds that are already present in the environment. One of the difficulties in making quantitative estimates of the rate of occurrence of toxicities

in the human population solely from data obtained with laboratory animals is the heterogeneity that exists in the human population. Variations in the factors represented by each of the parts of a toxic mechanism contribute to the total variance of the human population. The relative contributions of each of the parts may, however, vary with the subpopulation and the the toxicant. Since for good reasons toxicity studies are almost invariably performed with homogeneous strains of animals kept under carefully controlled environmental conditions, there is no way that any given strain of animals can adequately mimic the entire human population. Nevertheless, there is no reasonable alternative to the use of data obtained with homogeneous animal strains together with arbitrary safety factors in making first approximations of acceptable risks. It is essential that a consensus for an arbitrary safety factor be obtained. Since safety factors will inevitably fail with some substances, they will never replace the epidemiological studies and toxicity reporting programs. (12 REFS) (NLM)

**Biopharmaceutics and Clinical Pharmacokinetics: An Introduction
Notari, Robert E.
New York, M. Dekker, 1980
Type Document: Book
Note: 3rd edition, revised and expanded
Call Number: RM301.4.N67
EPA Libraries: EJE OTS

**Biopharmaceutics and Pharmacokinetics: An Introduction
Notari, Robert E.
New York, M. Dekker, 1975
Type Document: Book
Note: 2nd edition, revised and expanded
Call Number: RM300.N.58 1975
EPA Libraries: ELB Cinn

**Clinical Pharmacokinetics: A Modern Approach to Individualized Drug Therapy
Wartak, Joseph
New York, Praeger, 1983
Type Document: Series: Clinical Pharmacology
and Therapeutics Series V. 2
Call Number: RM301.5.W37 1983
EPA Libraries: ELB Cinn

**A Conceptual Development of Quantitative Environmental Impact
Assessment Methodology for Decision-makers
Prasartseree, M
TESCO Ltd Consulting Firm, 21/13-14 Soi Sukhumvit 18, Bangkok 11, Thailand
J Environ Manage; (1982). 14(4): 301-308
Heep Copyright: Biol Abs

There are 6 factors that must be taken into account when assessing the significance of an environmental impact arising from a project's activities, namely, impact magnitude, prevalence, duration and frequency, risk, importance and mitigation. Current environmental impact assessment methodologies in widespread use are suited for specific tasks of the 6 decision-making factors, but not all of them. An all-encompassing methodology is thus a combination or modification of existing techniques which retains strengths while eliminating weaknesses. Some entirely new concepts are introduced to improve the required decision-making aid capabilities. (NLM)

**The Current Use of Studies on Promoters and Cocarcinogens
in Quantitative Risk Assessment
Stara, JF; Mukerjee, D; McGaughy, R; Durkin, P; Dourson, ML
Environ. Criteria Assess. Off., U.S. EPA, Cincinnati
EHP Environ. Health erspect.; (1983). Vol 50: 359-68
CBAC Copyright: Chem Abs

A review with 63 refs. Review cocarcinogen risk assessment. Tumor promoter risk assessment review. (NLM)

**Development of Quantitative Estimates of Uncertainty in Environmental
Risk Assessments When the Scientific Data Base is Inadequate
Cothern CR; Coniglio WA; Marcus WL
Environment International (1986). V.12: 18 pp.

Direct and brief look at the problem of how to deal with uncertainties in risk assessments.

**Dose Dependent Toxicity
O'Flaherty ES
Univ. of Cincinnati Medical Center, Institute of Environmental Health
Comments on Toxicology. (1986). Vol. 1(1):23-34

**Drug Fate and Metabolism: Methods and Techniques
Garrett, Edward R; Hirtz, Jean L.
New York, M. Dekker, 1977
Type Document: Book
Keywords: Pharmacokinetics; Drugs; Metabolism
Call Number: RS189.D78
EPA Libraries: ELB Cinn

****Drug Product Design and Performance**
Smolen, Victor F; Ball, LuAnn
New York, Wiley, 1984
Type Document: Series: Controlled Drug Bioavailability: VI
Keywords: Biopharmaceutics; Pharmacokinetics;
Structure-Activity Relationship (Pharmacology)
Call Number: RM301.4.D78 1984
EPA Libraries: ELB Cinc

****Fundamentals of Clinical Pharmacokinetics**
Wagner, John G.
Hamilton, Illinois, Drug Intelligence Publications, 1975
Type Document: Book
Call Number: RM301.5.W33
EPA Libraries: EKB RTP

****Fundamentals of Drug Metabolism and Drug Disposition**
LaDu, Bert N; Mandel, H. George; Way E. Leong
Baltimore, William and Wilkins Co., 1971
Keywords: Pharmacokinetics; Drug Metabolism
Call Number: RM301.55.F86
EPA Libraries: EJE OTS; ELB Cinn; EMA R6 RM300.F83

****Fundamentals of Risk Assessment**
Whipple, Chris G.
Environmental Law Reporter 16: Aug 86, 10190-5

****The Importance of Metabolite Identification in Quantitative Risk Estimation**
Stevens, JT; Sumner, DD
Agric. Div., Ciba-Geigy Corp., Greensboro
J. Toxicol., Clin. Toxicol.; Vol 19, ISS 6-7, 1982, 781-805
CBAC Copyright: Chem Abs

A discussion on the relationship between xenobiotic metab. and risk assessment was presented. Proposed mechanisms of carcinogenicity; weaknesses of risk extrapolation and the validity of several types of model for use in risk extrapolation are considered. (NLM)

The Importance of Pharmacokinetic and Macromolecular Events as They Relate to Mechanisms of Tumorigenicity and Risk Assessment
Schumann, AM; Watanabe, PG; Reitz, RH; Gehring, PJ
Health Environ. Sci., Dow Chem., Midland
Toxicol. Liver; 1982, 311-31
CBAC Copyright: Chem Abs. A discussional review with 66 refs. Review pharmacokinetics tumoriginicity, risk assessment. (NLM)

****Kinetic Data Analysis: Design and Analysis of Enzyme and Pharmacokinetic Experiments**
Endrenyi, Laszlo
New York, Plenum Press, 1981
Keywords: Rate of Chemical Reaction; Enzymes; Pharmacokinetics
Proceedings of a satellite symposium...organized in conjunction with the XIth International Congress of Biochemistry, and held July 8-13, 1979 in Toronto, Canada.
Call Number: QP517.R4K56
EPA Libraries: EKB RTP

****Manual of Laboratory Pharmacokinetics: Experiments in Biopharmaceutics, Biochemical Pharmacology, and Pharmacokinetics, with a Consideration of Relevant Instrumental and Chromatographic Techniques**
Curry, Stephen H; Whelpton, Robin
Chichester: New York, Wiley, 1982
Type Document: Book
Call Number: RM301.4.C87
EPA Libraries: ELB Cinn

****Modeling of Inhalation Exposure to Vapors: Uptake, Distribution, and Elimination**
Fisevova-Bergerova, Vera
Boca Raton, FL, CRC Press, 1983
Type Document: Book
Keywords: Asphyxiating and Poisonous Gases; Mathematical Models; Pharmacokinetics
Call Number: RA1245.M6 1983
EPA Libraries: EKB RTP; ELB Cinn

****New Approaches in the Derivation of Acceptable Daily Intake (ADI)**
Dourson, ML
U.S. Environmental Protection Agency, Cincinnati, OH
Comments on Toxicology. (1986). Vol. 1(1):35-48 (19 Refs)

****Overview of Some Aspects of Quantitative Risk Assessment**
Fishbein, Lawrence
Natl Center for Toxicological Research, ARK
J Toxicology & Env Health, (Sep-Nov 80). V6, N5-6, p1275(22)
Survey report: Use of data from laboratory experiments using animals to estimate the human risk from long-term exposure to low doses of environmental carcinogens poses numerous biological, toxicological, and statistical problems, including that of extrapolating animal dose-response relations from the high-dose range, where animal test data are available, to the low doses that humans might encounter. Different mathematical models for extrapolation are described. The procedures for estimating human risk on the basis of animal studies are evaluated. (1 graph, numerous references, 4 tables) (ENVL)

****Pharmacokinetic Basis for Drug Treatment**
Benet, Leslie Z; Massoud, Neil; Gambertoglio, John G.
New York, Raven Press, 1984
Type Document: Book
Call Number: RM301.5.P46 1984
EPA Libraries: ELB Cinn.

****Pharmacokinetics**
Gibaldi, Milo; Perrier, Donald
New York, M. Dekker, 1982
Type Document: Series: Drugs and the Pharmaceutical Sciences: V. 15
Note: 2nd Edition, Revised and Expanded
Call Number: RM301.5.G5 1982
EPA Libraries: ELB Cinn

Physiological Pharmacokinetics Relevance to Human Risk Assessment
Li, A.P. (Ed.)
Toxicity Testing: New Approaches and Applications in Human Risk Assessment: Meeting, St. Louis, MO., USA. Sept. 14-15, 1983
Lutz, RJ; Dedrick, RL
XIX+280p
New York, NY, Raven Press
Illus. ISBN 0-88167-083-0; 1985. p.129-150
(NLM)

****QSAR and Strategies in the Design of Bioactive Compounds:**
Proceedings of the Fifth European Symposium on
Quantitative Structure-Activity Relationships,
Bad Segeberg, 1984
Seydel, JK
Weinheim, Federal Republic of Germany, VCH Verlagsgesellschaft, 1985
Type Document: Conference Proceedings
Keywords: Pharmacokinetics; Drug Design; Pharmaceutical Chemistry; Agricultural Chemistry
Call Number: RS420.E87 1984
EPA Libraries: ELB Cinn

Quantitative Assessment of Induced Genetic Ill-Health in Humans As a Model for Assessing Genetic Risks from Chemicals, in: Chemical Mutagenesis, Human Population Monitoring and Genetic Risk Assessment
Newcombe, HB
Prog Mutat Res. (1982). 3: 53-62
(NLM)

Quantitative Cancer Risk Assessment Methodology Using Short-Term Genetic Bioassays: The Comparative Potency Method
Lewtas, J.
Health Effects Research Lab., Research Triangle Park, NC
NTIS/PB86-117017, 17p

TD3: Quantitative risk assessment is fraught with many uncertainties. The validity of the assumptions underlying the methods employed are often difficult to test or validate. Cancer risk assessment has generally employed either human epidemiological data from relatively high occupational exposures or animal cancer data from lifetime rodent bioassays. Low-dose extrapolation methods are often used with the human epidemiological data to estimate risks at lower environmental exposure levels. Scaling factors are used with animal data to extrapolate from rodents to humans. The problems, controversies and uncertainties associated with these methodologies has encouraged us to develop the concept and methodology associated with a comparative potency method for cancer risk assessment. This comparative potency method may be particularly appropriate for application to the quantitative cancer risk assessment of combustion emissions. (NLM)

Same title in: Prog Clin Biol Res, V.208, 1986, P107-20

****Quantitative Predictivity of Carcinogenicity for Sister Chromatid Exchanges in Vivo**

Parodi, S; Taningher, M; Zunino, A; Ottaggio, L; De Ferrari, M; Santi, L
Ist. Naz. Ricerca Cancro, Univ. Genoa, Genoa
New York, Plenum, 1984
Basic Life Sci.; Vol 29A, ISS Sister Chromatid Exch., Pt. A, 1984, 409-29
CBAC Copyright: Chem Abs

The level of predictivity achieved by sister chromatid exchanges (SCEs) in vivo with respect to carcinogenicity in rodents was examd. Oncogenic potency index (OPI) and SCE index (SCEI) data for 59 compds. were compared. The global level of correlation between OPI and SCEI was very significant. For a chem. subclass of arom. amines, the correlation was much lower than for all the other compds. examd. Thus, SCE anal. can be used as a predictive test in the assessment of tumor risk, esp. if unsuitable chem. classes could be identified and avoided. (NLM)

****Quantitative Risk Assessment for Environmental and Occupational Health**

Hallenbeck, William H.; Cunningham, Kathleen M.
Chelsea, MI, Lewis Publishers, 1986
Type Document: Book
Keywords: Risk Assessment; Environmental Health; Occupational Health
EPA Libraries: EKB HQ

****Quantitative Risk Assessment of Environmental Hazards**

Brown, SL
Commission on Life Sciences, National Academy of Sciences, Washington, DC 20418
Annu Rev Public Health (1985). Vol 6: 247-67

Quantitative risk assessment may never become a rigorous scientific discipline because of the inherent difficulties in working with highly uncertain and often controversial data and methods, and because the predictions of risk assessment may not be subject to validation in their most important areas of application. However, the potential benefits of having quantitative estimates of risk may make quantitative risk assessment a valuable adjunct to traditional methods for making individual and social decisions about health hazards in the home, workplace, and general environment. Risk assessment, which is the process of estimating risks to populations exposed to hazardous agents or activities, must be distinguished from risk management, which is the process of forming and implementing a strategy for accepting or abating the risks. To the extent possible, these two processes should be kept separate. Quantitative risk assessment is in principle capable of estimating individual or lifetime excesses of specific health effects from exposures to a specified hazard. These excesses may be estimated on an absolute basis or expressed as a relative risk in comparison with the baseline risk that would exist without exposure. An individual risk is usually expressed in terms of the probability of developing the health effect in some time period following a specified exposure, whereas a population risk is the overall number of effects expected in a defined population with a defined distribution of exposure levels and patterns. The variation of risk with time after exposure may imply a constant absolute risk, a constant relative risk, or some other dependence on time, usually after a minimal latent period has elapsed. Risk estimates can rarely be made directly from observed human data, and models for extrapolating or projecting risk estimates from the conditions of observation to the actual conditions of exposure must be used. Dose-response are used for extrapolating from high laboratory or occupational exposures to low exposures encountered more frequently in human populations. Thresholds of dose or nonlinear dose-response relationships may be related to nonlinear pharmacokinetics prior to the ultimate exposure of the critical organ to the proximate carcinogen or other hazardous agent. Time-response models estimate risks for periods after exposure longer than have been observed in epidemiologic studies. Extrapolations from experiments with laboratory animals to humans are made difficult because of great differences in size, lifespan, physiology, and metabolism between human and animal. (NLM)

****Quantitative Risk Assessment:** Report of the Subcommittee
on Environmental Carcinogenesis, National Cancer Advisory Board
Samuels, SW; Adamson, RH
JNCI (1985). Vol 74, ISS 4: 945-51
(NLM)

****Quantitative Risk Assessment: State-of-the-Art for Carcinogenesis**
Park, CN; Snee, RD
Dow Chem., Midland
Fundam Appl Toxicol, Vol 3, ISS 4, 1983, 320-33
CBAC Copyright: Chem Abs

A review with 44 refs. of a crit. evaluation of the use of statistical models in carcinogenic risk assessment with emphasis on the strengths and weaknesses of current practice. (NLM)

Radiation Induced Cancer the Methods and the Problems of Quantitative Risk Assessment (German)
Frohlich, E
Vierteljahrsschr Naturforsch Ges Zuer; 129 (1), 1984, 21-37
(NLM)

****Ranking the Severity of Toxic Effects: Potential Applications to Risk Assessment**
Hartung, Rolf
Univ. of Michigan, Dept. of Environmental and Industrial Health
Durkin, Patrick R
Syracuse Research Corp., Center for Chemical Hazard Assessment
Comments on Toxicology. 1986. Vol. 1(1):49-63 (7 REFS)

****Rate-Controlled Drug Administration and Action**

Struyker-Boudier, Haj
Boca Raton, FL, CRC Press, 1985
Type Document: Book
Keywords: Pharmacokinetics
Call Number: RS201.C64R37 1985
EPA Libraries: ELM Cinn

****Risk Assessment of Toxic Environmental Substances Using a Generalized Multi-Hit Dose Response Model**

Rai, Kamta; Van Ryzin, John
(California State Polytechnic Univ) and; (Rand Corp).
Presented at Siam Inst for Mathematics & Society Conf, Utah, Jun 26-30, 78, p99 (19)

Technical report: A generalized multi-hit dose response model for assessing risks of toxic environmental substances is presented. Biological and statistical interpretations of the model are given. Statistical procedures for estimating model parameters and sample properties, and for using the model in risk assessment through extrapolation to low doses are explained. These procedures are applied to 12 sets of toxic response data from the literature. Model performance is similar to that of the one-hit model; however, the multi-hit dose response model is more stringent in its risk assessment. (30 references, 2 tables)

(ENVL)

****Risk Quantitation and Regulatory Policy**

This vol is comprised of papers reported at the Banbury Center confertence on Risk Quantitation and Regulatory Policy held in May 1984. The papers of Session 1, on regulatory programs utilizing risk assessment, had the following titles: the role of quantitative risk assessment in environmental regulations; use of quantitative risk assessment in regulatory decision making under federal health and safety statutes; the inevitability of risk quantitation and its potential contribution to food safety regulation; and legal impediments to the use of risk assessment by regulatory agencies. Papers in Session 2, on epidemiology in risk estimation, had these titles: epidemiology and risk assessment (estimation of gastrointestinal cancer risk from asbestos in drinking water and lung cancer risk from polycyclic aromatic hydrocarbons in air); approaches to the estimation of exposure in occupational epidemiology; the use of epidemiological data for the assessment of human cancer risk; and problems in dose-response and risk assessment (the example of asbestos). Session 3, on modeling and extrapolation, had papers with these titles: the impact of occupational exposure patterns on quantitative risk estimation; consequences of nonlinear kinetic dose-response models in carcinogenic risk assessment; and uncertainty in risk assessment. Papers in Session 4, on mutagenic risk in biological mechanisms, had these titles: attempts to estimate genetic risks caused by mutagens to later generations; and some aspects of quantifying and acting upon the risks of radiation exposures. Papers in Session 5, on toxicology and biological mechanisms, were on: carcinogenic risk assessment (a toxicologist's view); application of model systems in pharmacokinetics; biological variation (the unsolvable problem in quantitative extrapolations from laboratory animals and other surrogate systems to human populations); potential methods to monitor human populations exposed to carcinogens (carcinogen-DNA binding as an example); the relevance of tumor promotion and multistage carcinogenesis to risk assessment; and mechanistic considerations in the formulation of carcinogenic risk estimation. Papers in Session 6, on specific case histories, had these titles: a scientific approach to formaldehyde risk assessment; description of a carcinogenic risk assessment used in a regulatory proceeding (formaldehyde); human exposure estimates for hazardous waste site risk assessment; and risk assessment and risk management of benzene by the Environmental Protection Agency (EPA). Finally, papers in Session 7, on risk quantitation and the dynamics of policy formulation, had these titles: United States EPA revised interim guideline for the health assessment of suspect carcinogens; and the changing role of risk assessment in federal regulation. (NLM)

EPA Libraries: EJB HQ; EJE OTS; EKB RTP; ELB Cinn
Call number: RA1199.R58. 1985

****Some Issues in the Quantitative Modeling Portion of Cancer Risk Assessment**
Sielken, RL Jr.
Department of Statistics, Texas A&M University, College Station 77843
Regul Toxicol Pharmacol, Vol 5, ISS 2, 1985, p175-81

Several questions should be asked in order to determine the relevance and scientific merit of a quantitative cancer risk assessment. Twenty such questions are formulated here and briefly discussed. These questions are intended to identify important issues and serve as a checklist for risk managers and developers of quantitative risk assessments. Among the many factors involved in these questions are the carcinogenic response, quantal response models, time to response, competing risks, model shapes, goodness of fit, dose scale, high-to-low-dose extrapolation, consistency across different subjects, animal-to-human extrapolation, route-to-route extrapolation, exposure durations and patterns, short-term tests, consistency with human epidemiological data, human exposures, statistical variability impacts of assumptions and policy decisions and value judgments, risk characterization, upper and lower bounds, and keeping pace with scientific advances. (NLM)

****Toxicants and Drugs: Kinetics and Dynamics**
O'Flaherty, Ellen J.
New York, Wiley, 1981
Type Document: Book
Keywords: Poisons; Metabolism; Mathematical Models;
Dose-Response Relationship; Pharmacokinetics; Xenobiotic Metabolism; Toxicology
Call Number: RA1216.O35
EPA Libraries: EJE OTS; EKB RTP; ELB Cinn; EMB Ada;

Translation of Pharmacokinetic/Biochemical Data into Risk Assessment
Dietz, FK; Reitz, RH; Watanabe, PG; Gehring, PJ
Adv Exp Med Biol, Vol 136B, ISS Biol. React.
Intermed.2, Chem. Mech. Biol. Eff., Pt. B, 1982, 1399-424
CBAC Copyright: Chem Abs

A review with 38 refs. Review health hazard assessment pharmacokinetics. (NLM)

**Use of Quantitative Risk Assessment in Regulatory Decision Making
Under Federal Health and Safety Statutes
Hutt, Peter Barton
Coving & Burling
Type Document: Meeting Paper
EPA Libraries: EJB HQ

**The Use of Skin Penetration Data in Risk Assessment
Rodricks, JV; Turnbull, D
Environ Corp., Washington
CTFA Sci. Monogr. Ser.; Vol 2, ISS Pharmacokinet.
Top. Appl. Cosmet. Symp., 1983, 71-80
CBAC Copyright: Chem Abs

The incorporation of skin absorption data in a quant. carcinogenic risk assessment is discussed with an example of data on D&C Red No. 19 (81-88-9). Uncertainty with respect to extrapolation of in vitro data and in the differences in pharmacokinetics and metab. of dermally applied and orally administered materials still exist.

EPA Libraries: EJB HQ
(NLM)

METHODS OF ESTIMATING AND MEASURING RISK

****The Analysis of Actual Versus Perceived Risks**
Proceedings of the Society for Risk Analysis. Vol. 1
Covello, Vincent T., National Science Foundation,
Glamm, W. Gary, Food and Drug Administration,
Rodricks, Joseph V., ENVIRON Corp.,
Tardiff, Robert G., National Academy of Sciences (eds)
Corporate Source: Society for Risk Analysis
New York, Plenum (1986)
388 p. illustrated
0-306-41397-3
Type Document: Series. Society for Risk Analysis, Vol.1
Keywords: Risk Analysis; Comparative Study; Estimation Methodology; Actual versus Perceived

Research has shown that technical experts and nonexperts differ substantially in their risk estimates of health, safety, and the environment. Risk estimates by technical experts are more closely aligned with annual fatality rates than estimates by nonexperts. The contributors to this volume clarify the issue by presenting selected cases that represent some of the most important aspects and dimensions of ris; voluntary vs. involuntary; low vs. high probability of occurrence, exposure, and effects; and high vs. low health, safety, or environmental consequences.

Source of Abstract: Publisher
EPA Libraries: EJB HQ

Assessment of Risk from Low-Level Exposure to Radiation and Chemicals
Woodhead, Avril D.; Shellabarger, Claire J.; Pond, Virginia, Brookhaven National Laboratory; Hollaender, Alexander, Council for Research Planning in Biological Sciences, Inc.
New York, Plenum [1986]
542p., illustrated, Proceedings
0-306-42003-1
Type Document: Series: Basic Life Sciences, Volume 33
Keywords: Low-Level Exposure; Risk Assessment; Radiation Exposure; Chemical Carcinogens; Exposure-Response Relationships

Researchers around the world are focusing on the effects of radiation and chemical carcinogens, and the assessment risk involved has become an essential steppingstone in the setting of judicious exposure standards. This volume provides vital information on the practical aspects of assessing the risks of low-level exposure to radiation and chemicals. The emphasis is on exposure-response relationships, particularly the theoretical and practical similarities and differences between exposure to ionizing radiation. Specific topics include low-level exposure effects on single cells, response modification, effects in cell groups and animals, and monitoring human populations. Volume 33 in the series Basic Life.

Source of Abstract: Publisher

****Approach to Assessing Exposure to and Risk of Environmental Pollutants** (Revised) (Final rept)
Little, (Arthur D.), Inc., Cambridge, MA
Sponsor: Environmental Protection Agency, Washington, DC
Monitoring and Data Support Div.
Report No.: EPA/440/4-85/021 Apr 83 262p
Contract No.: EPA-68-01-3857; EPA-68-01-5949
PB85-222826/XAB

The report describes an integrated exposure and risk methodology developed for the U.S. Environmental Protection Agency (EPA) as part of a program to assess exposure/risk of 65 classes of chemicals (129 'priority pollutants') in the water environment. It provides an overview of the risk assessment process and a detailed discussion of the analytic components of an environmental exposure and risk assessment including approaches for evaluating; the environmental loadings resulting from production, transport, use, and disposal of the chemicals; the mechanisms of pollutant transport and transformation in environmental media and the concentrations detected; the extent of exposure of humans and other biota; and the risk presented to exposed populations. The methodology is intended to provide a general understanding of environmental exposure and risk assessment and to assist those who will be conducting this type of analysis. It contains numerous examples from exposure and risk assessments of 54 priority pollutants performed for EPA and a bibliography of source materials. (NTIS)

****Approaches to Risk Assessment for Multiple Chemical Exposures**
Stara, J.F.; Erdreich, L.S.
Environmental Protection Agency, Cincinnati, OH
Environmental Criteria and Assessment Office
Sponsor: Dynamac Corp., Rockville, MD
Report No.: EPA-600/9-84-008 Mar 84 288p
Prepared in cooperation with Dynamac Corp., Rockville, MD
PB84-182369

The Environmental Criteria and Assessment Office (ECAO) in Cincinnati has developed health risk assessment methods for chronic exposure to single chemical from a single route of exposure. Risk assessments for carcinogens associated an exposure level with a particular incidence of cancer using a non-threshold model which is linear at low doses. For systemic toxicants, the no-observed-adverse-effect level (NOAEL)/Uncertainty Factor approach was used to estimate an acceptable daily intake (ADI). In order to develop methods for assessing risk from exposure to mixtures of chemicals, all relevant routes and all exposure durations must be considered. The basis of the single chemical approach is constantly updated to keep pace with developments in pharmacokinetics, species and route extrapolation, mathematical models, additivity and interaction. These and other relevant issues were addressed and during a 20-day workshop on 'Approaches to Risk Assessment for Multiple Chemical Exposures' held by the U.S. Environmental Protection Agency in Cincinnati, Ohio on September 29 and 30, 1982. The workshop was attended by 50 scientists from EPA and private industry. This document presents the results of this workshop, including presentations, critiques and discussion for each of the 11 subtopics covered. (NTIS)

****Assessment of Risks to Human Reproduction and to Development of the Human Conceptus from Exposure to Environmental Substances**
Galbraith, W.M.; Voytek, P.; Ryon, M.G.
Oak Ridge National Lab., TN
Sponsor: Environmental Protection Agency, Washington, DC
Office of Research and Development; Department of Energy, Washington, DC
Report No.: ORNL/EIS-197; EPA/600/9-82-001; CONF--8010259--Summ.; CONF--801286--Summ.
Feb 82 165p
US Environmental Protection Agency conference on assessment of risks to human reproduction, Atlanta, GA, 1 Oct 1980
Contract No.: W-7405-ENG-26
DE82007897

The Offices of Health Research and of Health and Environmental Assessment within the Office of Research and Development sponsored a conference to produce a technical document on the current status of risk assessment methodologies for teratogenic and other reproductive effects. The conference brought together scientists knowledgeable in reproductive biology and teratology to discuss techniques and concepts pertinent to developing risk assessment methodologies. The document is divided into three main subject areas: assessment of toxicity to female reproduction, assessment of toxicity to male reproduction, and assessment of toxicity to the conceptus. There are three supplemental parts: pharmacokinetics and epidemiologic considerations, which are common to all toxicological assessments, and a special section on the behavioral aspects of sexual development. The specific areas addressed are the potential adverse effects on the female and male reproductive systems as well as adverse effects on the developing conceptus. A broad range of problems and effects are discussed, including infertility, early resorption of the conceptus, and possible behavioral disorders producted by subtle changes in the biochemical environment of the fetus. Suggestions are given for improvement in standard toxicological protocols for evaluation of reproductive risks, identifies new concepts and procedures that can be immediately applicable, and designates those that need further expansion and development through research. Included is a discussion on the predictive ability of the tests in estimating risk. (ERA citation 07:051825) (NTIS)

****Biological Monitoring**
Dowd, RM
Environmental Science and Technology: 215A; 1984

HMTC Biological monitoring is being reestablished as a method of measuring the effects of chemicals in humans or ecological systems. There are two ways to characterize biological monitoring; indication of the level of human exposure to a chemical substance and its effect, and the measurement of nonhuman exposure to certain substances and their effects (e.g., effect of PCBs on aquatic life). This second characterization is being used extensively in research. One area of investigation is the bioassay of effluents. An example is a LC50 test which quantifies the amount of effluent that will destroy 50% of the inhabitants being tested. Chronic aquatic toxicity tests utilize the method of nonhuman exposure, and is related to the reproduction statistics of water species. Another area of activity is the measurement of the chemical effects in aquatic organisms on a physiological subcellular level. The field of human biological monitoring has broadened because of the increased utilization of risk assessment. The Office of Research and Development under EPA is putting a great deal of time and money into the area, including research in field-validated bioassay techniques, toxic treatability evaluations of specific industries, and the relationship between the exposure of a person to an ambient level of a substance through food, air, or water, and the amount concentrated in his.organs and tissues. (NLM)

Conference on the Safety Evaluation of Chemicals
Nelson N
New York University, New York, NY
CRISP/86/ES03820-01
US Dept of Health & Human Services; Public Health Service;
National Inst of Health, National Institute of Environmental
Health Sciences
CRISP Data Base National Institutes of Health
RPROJ/CRISP: Here proposed is a series of three Workshop Conferences aimed at examining new and emerging methods for safety evaluation of chemicals; these Workshops lead to published reports in book form. These are conducted by the Scientific Group on Methodologies for the Safety Evaluation of Chemicals, an international organization sponsored by the International Programme on Chemical Safety (IPCS) of the World Health Organization (WHO) which includes the International Labor Organization (ILO) and United Nations Environment Program (UNEP) and the Scientific Committee on Problems of the Environment (SCOPE) of International Council of Scientific Unions (ICSU). The Group has an international membership which encourages the review of difficult problems relating to methods for evaluating the effects of chemicals on human and non-human biota. These Workshops result in books composed of commissioned, individually authored papers and a Joint Report. The first Workshop (now available from Wiley Publishing Company) dealt with Methods for Assessing the Effects of Chemicals on the Reproductive Functions; the second, about to be published, dealt with Quantitative Risk Assessment; the third, completed in August, 1983, is now in final editing and deals with Methods for Assessing the Effects of Mixtures of Chemicals; the fourth, completed in August 1984 is also in final editing and covered the Predictive Value of Short-Term Tests for Non-Genotoxic Effects. Candidate topics are proposed by the Executive Committee of SGOMSEC and chosen in consultation with the Sponsors. Normally, one such Workshop is held each year following 8-10 months of preparatory writing by the invited contributors. A main objecitve is the specific identifi-cation of research needs for the improvement of methods for lthe safety evaluation of chemicals. (NLM)

****Direct Mutagen Risk Assessment: The Development of Methods to Measure Immunologic and Genetic Responses to Mutagens**
Strauss GHS; Waters MD; Sandhu SS
U.S. Environmental Protection Agency, Research Triangle Park, NC
EPA symposium on short-term bioassays in the evaluation of
complex environmental mixtures, Chapel Hill, NC, 27 Mar 1984
Plenum Press, New York, NY
Report No.: CONF-8403131
Type document: Analytic of a book; Conference literature

Accepting society's "addiction" to the products of industrial technology makes it our responsibility to attempt to ascertain the adverse effects of chemical and physical agents, according to the authors. They state that an escalating awareness of the potential and manifest severities of mutagen-related health effects confers a sense of urgency on the problem of producing and utilizing relevant data for sound risk-versus-benefit predictions and decisions. The purpose of this paper is to review their efforts to develop methods with which to evaluate the in vivo effects of mutagen exposure in cells taken directly from the body. (DOE)

****Environmental Assessment: Short-Term Tests for Carcinogens, Mutagens and Other Genotoxic Agents**
(Technology transfer rept.)
Trontell, Ann; Connery, Jan
Energy Resources Co., Inc., Cambridge, MA
Sponsor: Environmental Research Center, Cincinnati, OH
Report No.: EPA/615/9-79/003
Jul 79 35p
Prepared in cooperation with Health Effects Research Lab., Research Triangle Park, NC.
Prepared for Environmental Research Center, Cincinnati, OH
PB-300 611/1

Short-term tests have been developed to serve as rapid and relatively inexpensive predictors of a chemical's potential to cause chronic effects. These tests employ bacteria, yeast, plants, insects, isolated mammalian cells and whole animals. Short-term tests can detect a chemical's genotoxicity, that is, its ability to alter a cell's genetic material (DNA). The document is organized into five sections. The first section discusses how short-term tests can contribute to hazard assessment, while the second describes the scientific basis and techniques of short-term tests. A general strategy for how short-term tests can be used to detect a chemical's potential long-term toxicity is outlined in the third section. Some program applications of short-term test research are presented in the fourth section, and the fifth section describes some of the current research activities. An overall perspective concludes the document. A glossary of technical terms is provided at the end of the document along with an appendix of technical information on specific short-term tests. (NTIS)

****Environmental Methods Testing Site Project Management Plan** Draft.
Fitzsimmons, Charles K.
Environmental Research Center, Univ of Nevada, Las Vagas Nevada 98154
Cooperative Agreement No. CR812189-01
Project Officer: Shelly J. Williamson, EPA, Exposure Assessment Division, Environmental Monitoring Systems Lab, Las Vegas, Nevada 89114

The EPA has a need to develop and improve methods for assessing human exposure to toxic substances to support regulations resulting from the Toxic Substances Control Act of 1976. The Environmental Methods Testing Site project is a means to provide the research in the area of human exposure methods development.
EPA Libraries: EJB HQ

****Estimating Risk for Carcinogenic Environmental Contaminants and Its Impact on Regulatory Decision Making**
Cothern CR; Marcus WL
Regulatory Toxicology and Pharmacology, 4, 265-274, 1984
General overview of problems, complexities and uncertainties involved in regulatory risk assessment.

****Estimation of the Risk to Human Health Due to Volatile Organic Compounds in Drinking Water Using Trichloroethylene**
Cothern CR; Coniglio WA; Marcus WL
Environmental Science and Technology 20, 111-115, 1986
Short, concise discussion of risk assessment methodology used in assessing quantitative risk for carcinogens in drinking water using trichloroethylene as an example, 18 pages.

****Fuzzy Sets, Natural Language Computations, and Risk Analysis**
Schmucker, Kurt J.
Rockville, MD, Computer Science Press, 1984
Keywords: Fuzzy Sets; Risk; Language and Languages
EPA Libraries: EKD Athens
Call Number: QA248.S345

****Indicators of Environmental Quality**
Thomas, William A., Oak Ridge National Laboratory
New York, Plenum [1986]
286p, illustrated, Proceedings
0-306-36301-1 (hard cover)
0-306-20011-2 (paperback)
Type Document: Series: Environmental Science Research. Volume 1
Keywords: Risk Analysis Design and Testing;
Environmental Quality Indicators
Stressing the importance of developing a common denominator with which to assess the environment, this systematic work examines indicators and indices which measure variables and provide overall composite values for environmental shifts. By facilitating communication among diverse disciplines, this convenient shorthand system is essential for solving these complex problems.

****Life Table Methodology for Evaluating Radiation Risk: An Application based on Occupational Exposures**
Bunger BM; Cook JR; Barrick MK
Environmental Protection Agency, Washington, DC,
Office of Radiation Programs
Health Phys. (UK) v. 40:4. Apr 1981, 439-45p.
Type document: Journal article; numerical data

This study describes an application of the life table method for examining the risk of death from exposure to low-level ionizing radiation. The method provides estimates of the expectation of premature death and the resultant life shortening. Applications to occupational exposure situations are used to demonstrate the technique. Doses ranging from 0.2 to 5.0 rem/yr and over age spans from 10 yr to working lifetimes are investigated. A technique for comparing radiation related mortality with nonradiation related risk of death from on-the-job accidents is introduced. Results show that workers receiving whole body doses equal 5 rem/yr for sustained periods of time incur significant risk of premature death from radiation induced cancer. The risk is estimated, in some cases, to be as high as, or higher than, the average risk of accidental death in high risk industries, depending upon factors such as length of exposure, age at time of exposure, and the radiation risk model used. (DOE)

****Low-Probability/High-Consequence Risk Analysis. Issues, Methods and Case Studies. Proceedings of the Society for Risk Analysis. Volume 2**

Waller, Ray A., Los Alamos National Laboratory;
Covello, Vincent T., National Science Foundation; (eds)
Society for Risk Analysis
New York, Plenum [1986]
582p., Illustrated
0-306-41725-1
Type Document: Series: Society for Risk Analysis. Vol.2
Keywords: Risk Analysis, Low-Probability/High Consequence;
Estimation Methodology, Public Policy; Comparison of Methods

How effective are the methods currently used to estimate risks surrounding nuclear and chemical accidents? How are estimates incorporated into public policies? What are the criteria for comparing and evaluating different LP/HC risk analysis methods and risk management policies? These are some of the questions tackled by a team of specialists in fields ranging from toxicology to policy analysis.
Source of Abstract: Publisher

Mathematical Modeling Application to Environmental Risk Assessments (Fate of Chemicals in the Environment)

Honeycutt RC; Ballantine LG
CIBA-GEIGY Corp, NC
ACS Sym Series 225, 1983, p249(14) Assn Report

An insect growth inhibitor is used as an example to show how a risk assessment can be performed using the SWRB runoff model coupled to the exams chemical fate model. Runoff of the compound from agricultural watersheds was estimated using the SWRB model. These data were then used to estimate inhibitor loading into the exams model for the aquatic environments. Maximum concentrations of the chemical that would occur in various compartments of defined ponds and lakes were computed. Expected concentrations in water were then compared with acute and chronic toxicity data for fish and aquatic invertebrates to establish a safety factor for the inhibitor in aquatic ecosystems. (1 diagram, 3 references, 9 tables) (ENVL)

****Measurement of Risks**
Berg, George G.: Maillie, H. David,
The Univ. of Rochester School of Medicine and Dentistry. (eds.)
New York, Plenum, 1986
560p, illustrated, proceedings 0-306-40818-X
Type Document: Series: Environmental Science Research, Volume 21
Keywords: Risk Assessment Methodologies; Statistics; Comparative Study; Cancer; Energy Sources; Inhalation Toxicology; Drinking Water

In this volume experts consider the problem of risk assessment from the philosophical, statistical, and comparative viewpoints. Methods of risk assessment are examined, as are topics ranging from the statistical inference of risks to such areas as cancer risks, the comparative risks of energy sources, and the hazards of inhaled contaminants and contaminated drinking water.

****A Methodology for Allocating Reliability and Risk**
Cho, NZ; Papazoglou, IA; Bari, RA
Corporate Source: Brookhaven National Lab.;
Prepared for the U.S. Nuclear Regulatory Commission, Washington, DC, U.S. Regulatory Commission, 1986
Report No.: NUREG/CR4048; BNL NUREG-51834
Type Document: Report
Keywords: Nuclear Power Plants; Decision Analysis; Multiobjective Optimization; Risk Model; Preference Assessment; Uncertainty Analysis; Reliability Cost Functions
EPA Libraries: EJB HQ
Call Number: TK9152-C54 1986

****Methods for Risk Assessment.**
Symposium sponsored by American Chemical Society, Division of Chemical Health and Safety (Probationary),
173rd ACS National Meeting, New Orleans, LA March 21-22, 1977
American Chemical Society
Keywords: Risk; Poisons; Safety Measures
EPA Libraries: EJE OTS
Call Number: HB615.R5

Methods in Risk Management - A Working Paper
Uppuluri, VRR, Oak Ridge National Lab., TN
Department of Energy, Washington, DC
NTIS/DE85008360

The methods in Risk Analysis to determine the health and environmental effects of hazards to individuals and society are evolving in this rapidly developing field. In this paper, we briefly discuss the current distinctions between Risk Assessment and Risk Management, and discuss some methodological issues. We conclude this paper with a method useful for prioritization in connection with the environmental, health, and safety deficiencies at a number of sites. (9 references) (ERA citation 10:022730) US/Japan workshop on tritium radiobiology and health physics, Tokyo, Japan, 29 Oct 1984. (NLM)

****Multiple Factor Interaction in Environmental Disease: Potential for Risk Modification and Risk Reversal**
Selikoff, Irving J.
CUNY
Royal Society of Canada/et al Risk Assessment & Perception Sym, Toronto, Oct 18-19, 82, p71 (9)

Conference paper: Risk assessment in environmental and occupational disease at present has inevitable constraints. Emphasis has been on statistical analyses to establish confidence limits. The limitations of this perspective exclude the rapid biological innovations that are accumulating, which can alter risk. Among these are multiple factor interactions among agents. Using such information can not only modify risk but can actually lead to risk reversal. (23 references, 4 tables) (ENVL)

New Mechanistic Models for Risk Assessment
Chandler, Jerry L.R., U.S. Food and Drug Administration
Fundamental and Applied Toxicology. 1985, Vo. 5, 634-652.

****Perceiving Environmental Quality. Research and Applications**
Craik, Kenneth H., Univ. of California at Berkely;
Zube, Ervin H., Univ. of Massachusetts (eds.)
New York, Plenum (1986)
324p, Illustrated
0-306-36309-7
Type document: Series. Environmental Science Research, Volume 9
Keywords: Risk Assessment Methodologies

Contributors from several fields discuss research needs and methodological issues in assessing various environments --residential and institutional, scenic and recreational, air, water and sound. Research strategies are suggested....This book should remain a useful reference for several years.

Source of abstract: Perceptual and Motor Skills

****Rating the Risks**
Slovic, Paul; Fischhoff, Baruch; Lichtenstein, Sarah
Perceptronics, ORE
Environment, Apr 79, V21, N3, P14 (12)

Technical feature: In order to improve hazard management, a risk assessment industry has developed in the last 10 yr that combines the efforts of physical, biological, and social scientists in identifying hazards and measuring the frequency and magnitude of their consequences. Some risk assessments rely on extensive statistical data (e.g., the frequency and severity of automobile accidents) and a degree of human judgment. Others, such as those assessing the risks of nuclear power, must be based on theoretical analyses or "fault trees." Four ways in which experts can misjudge potential hazards are described. Methods for analyzing risk judgments are discussed. The roles of the public and of experts in forming realistic risk assessments are considered. (3 diagrams, 1 drawing, 6 graphs, 9 photos, 24 references, 4 tables) (ENVL)

A Review of Risk Assessment Methodologies
Report, March 1983
Marcus Gail H.
United States House Com. on Science and Tech.
Subcom. on Science, Research, and Tech.
'83 viii+78p, il tables charts
Series: 98th Cong., 1st sess.; Serial B; Com. print;
Order Info: Washington, DC 20515
Prepared by the Congressional Research Service, Library of Congress
Techniques used in the analysis of technology-based health and safety risks to human beings. (PAIS)

****Risk Assessment for the Regulation of Carcinogens in the Environment**
Cothern CR; Van Ryzin J; Saxena J (ed.)
In: Hazard Assessment of Chemicals, Vol. 4, pgs 179-241 1985.
New York, Academic Press, 1985
Risk analysis methodology, discussion of models used, uncertainty involved and application to vinyl chloride and dichloromethane as examples.

****Risk Assessment of Complex Mixtures**
Gibbs, HF; Chen CW; Waters MD; Sandhu SS
U.S. Environmental Protection Agency, Washington, DC 1985.
353-362 p.
EPA symposium on short-term genetic bioassays in the evaluation of complex environmental mixtures, Chapel Hill, NC 27 Mar. 1984
New York, NY Plenum Press
Report No.: CONF-8403131-
Type document: Analytic of a Book; Conference literature While the simple model presented here cannot explain all of the synergistic or antagonistic carcinogenic effects observed in animal and human studies, the model can explain some of the data, and the authors state that implications from the multistage mathematical model should be considered in the design of future animal studies or even of short-term bioassy studies. In regard to animals, they suggest that mixtures be fractionated and administered in varying dosages at varying ages. They add that epidemiologic data should be reported whenever possible to facilitate analysis of the affected carcinogenic state or stages on which the complex mixture may be acting. They say, finally, that since an early-stage carcinogen's effects may take many years for detection, this may in turn affect the way in which we regulate complex mixtures and the way in which we study them. (DOE)

****Risk Assessment, Safety Evaluation of Food Chemicals**
Newborne, Paul Medford
National Research Council (U.S.), Subcommittee on Food Toxicology
Washington, D.C., National Academy Press, 1980
Type Document: Book
Keywords: Food Analysis; Food Additives
EPA Libraries: EJE OTS; ELA R5
Call Number TK545.N3 1980

****Role of Mathematical Models in Assessment of Risk and in Attempts to Define Management Strategy**
Flamm, WG; Winbush, JS
Bureau of Foods, Food and Drug Administration, Washington, D.C.
Fundam Appl Toxicol; Vol 4, ISS 3 Pt 2, 1984, PS395-401

Risk assessment of food-borne carcinogens is becoming a common practice at FDA. Actual risk is not being estimated, only the upper limit of risk. The risk assessment process involves a large number of steps and assumptions, many of which affect the numerical value estimated. The mathematical model which is to be applied is only one of the factors which affect these numerical values. To fulfill the policy objective of using the "worst plausible case" in estimating the upper limit of risk, recognition needs to be given to a proper balancing of assumptions and decisions. Interaction between risk assessors and risk managers should avoid making or giving the appearance of making specific technical decisions such as the choice of the mathematical model. The importance of this emerging field is too great to jeopardize it by inappropriately mixing scientific judgments with policy judgments. The risk manager should understand fully the points and range of uncertainty involved in arriving at the estimates of risk which must necessarily affect the choice of the policy or regulatory options available. (NLM)

The Role of Multimedia Fate Models in Chemical Risk Assessment (Fate of Chemicals in the Environment)
Eschenroeder, Alan
Arthur D. Little, Inc., MA
ACS Sym Series 225, 1983, p89(16) Assn Report

Mathematical models for chemicals moving through air, water, soil, and biota are related to methodologies for assessing health risks to individuals or ecosystems experiencing environmental exposures. Procedures for assessing risks are traced from source to receptors, and the application of models to this process is described. Acute risks are distinguished from chronic risks in the context of environmental regulatory requirements. A technique for selecting and assembling multimedia models based on release, environmental, and receptor characteristics is explained. (22 references) (ENVL)

Study of Application and Suitability of Hazard/Risk Analysis Methodology for Environmental Considerations

Kardos, G.
Carleton Univ, Ottawa
ENV Canada Report, Dec 80 (49)

Special report: The principal methods presently used in Canada for risk/hazard analysis are outlined. The usefulness and effectiveness of the techniques in contributing to the reduction of critical accidents are surveyed. Methodologies evaluated include failure mode and effect analysis, fault tree analysis, event tree analysis, risk/benefit analysis, and safety analysis. These methods are found to be imperfect instruments, depending heavily on the skill of the analyst. To be most effective, risk/hazard analysis should be carried out concurrently and as part of, the design, by the agency responsible. (13 diagrams, 1 graph, 27 references) (ENVL)

****Techniques for the Assessment of Carcinogenic Risk Due to Drinking Water Contaminants. 1986**

To be published in CRC Critical Reviews.

Risk analysis methodology and discussion of uncertainty for examples including volatile organic compounds, inorganic compounds, pesticides, radionuclides, microbiological contaminants, asbestos and others. 112 pages

****Techniques for the Assessment of the Carcinogenic Risk to the U.S. Population Due to Exposure from Selected Volatile Organic Compounds from Drinking Water via the Ingestion, Inhalation and Dermal Routes**

Cothern CR; Coniglio WA; Marcus WL
Environmental Protection Agency, Washington, DC.
Office of Drinking Water, 1 May 84 254p
PB84-213941

A methodology is developed for the assessment of the risk due to drinking water containing trace levels of nine selected volatile organic compounds (VOCs). The nine VOCs are; benzene, carbon tetrachloride, 1,1-dichloroethylene, 1,2-dichloroethane, dichloromethane, perchloroethylene, 1,1,1-trichloroethane, and vinyl chloride. The risk assessment contains two major parts; viz, a hazard assessment and an exposure assessment. The hazard assessment uses animal bioassay data and extrapolates the dose-response curve using four models; logit, probit, multistage and Weibull. The hazard and exposure assessments are combined to estimate the population risk and provide a risk reduction analysis. This latter analysis estimates the cases averted for different control levels. An extensive analysis is included of the uncertainties to all parts of the risk assessment. It is concluded that the uncertainty in exposure assessment is less that an order of magnitude and that the uncertainty in hazard assessment is 4-6 orders of magnitude. The largest contribution, by far, to the uncertainty in the risk assessment is due to the choice of model to fit the bioassay data. (NTIS)

****Toxicity Testing: New Approaches and Applications in Human Risk Assessment [1985]**
Li, AP
New York, Raven Press, 1985
Type Document: Conference Proceedings
Keywords: Toxicity Testing; Health Risk Assessment; Bibliography
Based on a conference held Sept 14-15, 1983 in the World Headquarters of Monsanto Co, St. Louis, MO
EPA Libraries: EHA R1; EKB RTP; ELB Cinn
Call Number: RA1199.T673 1985

****Uncertainty in Population Risk Estimates for Environmental Contaminants.**
Cothern, CR; Coniglio WA; Marcus WL
U.S. Environmental Protection Agency, Office of Drinking Water (WH-550), Washington, DC
To be published in the proceedings of the Annual Meeting of the Society for Risk Analysis, Knoxville, TN, October 1984, Plenum Press
Analysis of the uncertainties involved in estimating the risk to humans due to selected volatile organic compounds in drinking water. 33 pages

Use of Environmental Health-Risk Analysis for Managing Toxic Substances
McKone, TE
Lawrence Livermore National Lab., CA
Sponsor: Department of Energy, Washington, DC
Report No.: UCRL-92329; CONF-850612-1, Mar 85 17p
Air Pollution Control Association annual meeting and exhibition, Detroit, MI, 16 Jun 1985
Type Document: Conference Proceeding
Contract No.: W-7405-ENG-48
DE85008964/XAB
This paper presents a set of simple models used to assess health risks based on toxicity, environmental mobility, and persistence. These models use a representative landscape in order to describe the steady-state distribution of arsenic, tritiated water, and TCDD as a result of continuous additions to soil. This information is used to assess potential exposures. Application of the screening model to three chemically different carcinogens reveals that the environmental health risk does not scale with direct measures of toxicity. As estimated here, the environmental health risk of TCDD relative to tritiated water and arsenic is roughly an order of magnitude less than its cancer potency relative to these compounds. The difference is attributable in large part to the immobility of TCDD relative to tritium and the lower persistence of TCDD compared to arsenic. The purpose is to present a simple procedure for using the relative behavior of toxic species under prototype conditions as a basis for risk management. (21 references, 4 tables) ERA citation 10:026203. (NTIS)

HEALTH RISKS

GENERAL

****Advances in Health Risk Assessment for Systemic Toxicants and Chemical Mixtures**
An International Symposium [1985]
Stara Jerry F; Erdreich Linda S
Princeton, NJ, Princeton Scientific, 1985
Type Document: Series: Toxicology and Industrial Health
0748-2337 V. 1, No. 4
Keywords: Environmental Health; Health Planning; Decision-Making;
Health Risk Assessment; Toxicity Testing
EPA Libraries: ELB Cinc.
Call Number: RA 565.A2A38 1985

****Application of Risk Assessment to Food Safety Decision Making**
Rodricks J, Taylor, MR
Environ Corporation, Washington, DC
Regul Toxicol Pharmacol. 3(3):275-307 1983

The purpose of this report is to present the scientific basis of risk assessment and to demonstrate that risk assessment can be used to make decisions about the safety of our food supply. The report has been prepared as a resource for those involved in the current discussions in Congress and elsewhere over the policies by which the safety of the American food supply is evaluated and assured. The document is not intended to present an argument for any particular food safety policy, but rather to address a key scientific issue that arises in the review of policy options. It distinguishes risk assessment--the acientific process of identifying and evaluating potential risks--from risk management, the separate policy decision regarding what constitutes "safety" or an acceptable degree of risk. (NLM)

****Assessment of Risk from Low-level Exposure to Radiation and Chemicals:**
A Critical Overview [1985]
Woodhead, Avril D.
Brookhaven National Laboratory
New York, Plenum, 1985
Type Document: Series: Basic Life Sciences, V. 33
Keywords: Ionizing Radiation; Toxicology; Health Risk Assessment
Papers presented at Brookhaven National Laboratory,
Upton, NY, May 20-23, 1984
EPA Libraries: EJA R3; ELB Cinn.
Call Number: RA1231.R2A78 1985

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****The Characteristics of an Adverse Effect: Using the Example of Developing a Standard for Lead**

Presented at a symposium entitled "Scientific Praxis in Risk Management" at the annual meeting of the American Association for the Advancement of Science, Los Angles, CA, May 29, 1985

Marcus, WL, Cothern, CR

Drug Metabolism Reviews. 16(4):423-440, 1985

Examination of the different health related endpoints due to exposure to environmental lead and discussion of which to choose in the development of a standard.

****Chemical Emergency Preparedness Program: Chemical Profiles Interim Guidance**

Environmental Protection Agency, Washington, DC
Dec 85, 1435p EPA/560/7-85/013
NTIS NO. PB
PB86-155264/REB
See also PB86-155256/REB

Keywords: *Chemical Compounds, *Toxicity, *Air Pollution, *Management Planning, *Hazardous Materials, Sites, State Government, Accidents, Tables(Data), Safety, Chemical Properties, Physical Properties, Chemical Analysis, Fire Safety, *National Air Toxics Strategy, *Toxic Substances, Environmental Protection Agency, Listings, Occupational Safety and Health.

The document, developed by the U.S. Environmental Protection Agency (USEPA), is part of the USEPA National Air Toxics Strategy. The document is provided in support of EPA Chemical Emergency Preparedness Program (CEPP) which deals with accidental release of acutely toxic chemicals. For each acutely toxic chemical listed in the CEPP guidance document (report number PB86-155256), a chemical profile is available. A chemical profile is a collection of information on the chemical identify hazardous identity, physical/chemical characteristics, fire and explosive hazard, reactivity,health hazard, use, and precautions for handling and use of the chemical. The information is presented in the format that conforms as closely as possible to the Occupational Safety and Health Admininstration (OSHA) recommended format for a Material Safety Data Sheet (MSDS).

****Critical Considerations in the Assessment of Health and Environmental Risks -- What We Have Learned from the Nuclear Experience**

Vaughan, Burton E.

The Science of the Total Environment, 1983 Vol. 28 (June), p. 505
(ENV Bib)

****Evaluation and Risk Assessment of Chemicals:**
Proceedings of a Seminar, Lodz, Poland, 1-6 September 1980
Copenhagen, World Health Organization, 1982
Type Document: Series: Health aspects of chemical safety.
Interim Document No. 6
Keywords: Chemicals; Safety Measures; Toxicity Testing
EPA Libraries: EJB HQ TP149.W66 No.6; EKA R4 TP149.$b.W66
No.6; EKC G.Breeze; EMB ADA; ESB Corvallis TP149.E8

****Food Safety: Revising the Statute**
Kessler, DA
Montefiore Medical Center, Bronx, NY
Science, 223(4640:1034-40 1984

There is increasing recognition that federal food safety laws and policies need to be revised. Congressional debate on proposed amendments to the Food, Drug, and Cosmetic Act has generated several different perspectives on how the food safety laws should be changed. Before a consensus can be reached, scientists, regulators, the food industry, and consumers will have to review such complex and controversial issues as the level of acceptable risk, the value of risk-benefit analysis, the proper role of independent scientific review, and the reliability of quantitative risk assessment. (NLM)

****A Framework for Assessing Health Risks Associated with National Ambient Air Quality Standards**
Richmond, Harvey M.
EPA Office of Air Quality Planning and Standards
The Environmental Professional 1981, Vol. 3, p.225-233
EPA Libraries: EJB HQ

****Health and Environmental Risk Assessment**
Ricci, Paolof; Rowe, MD
Corporate Source: Electric Power Research Institute,
Brookhaven National Laboratory
New York, Pergamon Press, 1985
Type Document: Conference Proceedings
Keywords: Energy Development; Energy Industries; Health
Risk Assessment
Based on a workshop held at Brookhaven National Laboratory,
Dec. 1981
EPA Libraries: EKB RTP
Call Number: RA568.5H4

Improving the Characterization and Treatment of Uncertainty in Health and Environmental Risk Assessments
Final Report
Morgan MG, Henrion M
Carnegie-Mellon Univ, Pittsburgh, PA, Dept. of Engineering and Public Policy
Department of Energy, Washington, DC
NTIS/DE86005743, 14p

TD3: Uncertainty plays a centrally important role in health and environmental risk assessment. However, in the majority of quantitative health and environmental risk assessments the characterization and treatment of this uncertainty has been quite inadequate. We have worked on several aspects of the problem of improving such treatment. First, we have made a variety of improvements in the C-MU developed Demos computer based modeling environment, and have also prepared a Demos user tutorial to assist new users who want to use this software environment for the treatment of uncertainty in their risk analyses. Second, we conducted a research workshop on the problems of classifying sources of uncertainty and the problems of propagating uncertainty through models. This report includes a working paper on these subjects. Third, in a cooperative effort that has also involved NSF and other support, we have been engaged in the preparation of a monograph titled Uncertainty: A guide to the characterization and treatment of uncertainty in risk and other quantitative policy analysis. A detailed outline of this monograph is presented in this report. (ERA citation 11:014740) (NLM)

****Principles of Health Risk Assessment**
Ricci, Paolo, F.
Englewood Cliffs, NJ, Prentice-Hall, 1985
Keywords: Environmental Health--Evaluation; Risk
EPA Libraries: ELB Cinn
Call Number: RA566.P74

****Risk Assessment Review Group Report to the U.S. Nuclear Regulatory Commission**
Lewis, Harold Walter
Corporate Sources: U.S. Nuclear Regulatory Commission
Washington, DC, U.S. Nuclear Regulatory Commission, 1978
Type Document: Report
Keywords: Health Effects; Nuclear Power Plants; Radiation Hazards
EPA Libraries: EKT RTP; EIA R2 Y3.N88:25 0400

****Toxicological Risk Assessment**
Clayson, DB; Krewski, D; Munro, Ian C.
Boca Raton, FL, CRC Press, 1985
Type Document: Book
Keywords: Toxicity Testing; Health Risk Assessment; Government Policy; Decision-Making; Environmental Health
EPA Libraries: EJA HQ; EJB HQ; EJE OTS; EKB RTP; ELB Cinn; ELD Duluth
Call Number: RA1199.T68 1985

HEALTH RISKS

CANCER .... *includes carcinogenesis, carcinogens, carcinogenicity, genetics, epidemiology, and multi-media exposure.*

****Approach to Risk Assessment for Genotoxic Carcinogens Based on Data from the Mouse Skin Initiation-Promotion Model**
Burns F; Albert R; Altshuler B; Morris E
Institute of Environmental Medicine, New York University Medical Center, NY
Environ Health Perspect, Vol 50, 1983, p309-20
(NLM)

Basic Requirements for Health Risk Analysis: The Decision Point Approach for Systematic Carcinogen Testing
Weisburger JH; Williams GM
Naylor Dana Inst. Dis. Prevent., American Health Found., Valhalla
Health Risk Anal., Proc. Life Sci. Symp., 3rd; 1981, 249-71
CBAC COPYRIGHT: CHEM ABS. A review with refs.
Review genotoxicity carcinogen detection.
(NLM)

Cancer and the Environment: Possible Mechanisms of Thresholds for Carcinogens and Other Toxic Substances
New York, Mary Ann Liebert, Inc., 326 p., 1983
Papers on possible mechanisms of thresholds for carcinogens and other toxic substances reported at the Symposium of the International Study Center for Environmental Health Sciences, held in New York City, November 2-4, 1981, are presented under the following titles: potential role of intercellular communication in the rate-limiting step in carcinogenesis; chemical, physical, and genetic factors interfering with DNA repair - a review; the importance of pharmacokinetic principles in characterizing carcinogenic thresholds for naturally occurring and synthetic chemicals; metabolic activation of xenobiotics: ethylene dibromide and structural analogs; thresholds in chemical carcinogens; catabolic function of peroxisomes: modification by hypolipidemic drugs; systems detoxifying chemical carcinogens; importance of threshold in safety assessment of food additives, significance of animal pathology observations; artifacts due to secondary pathology: case study examples; chasing a receding zero: impact of the zero threshold concept on actions of regulatory officials; chemical basis for cell mutation; the development of secondary pathology with free radical reactions as a threshold mechanism; dose patterns of cellular effects induced by carcinogens: evidence for the presence or absence of thresholds; effect of antioxidants on free radical production during in vivo metabolism of carbon tetrachloride; thresholds in carcinogenesis - a view from epidemiology; cancer hazards, risk and thresholds: an assessment; species longevity as an indicator for extrapolation of toxicity data among species of placental animals; thresholds in acute and long term animal studies; stages in cancer

development; opportunities for thresholds; possibilities for dietary fat and antioxidants as modulators of mammary carcinogens; dietary and other modulators of carcinogenesis; and implications for the future: regulation of chemicals and prevention of cancer. (NLM)

The Cancer Problem: Risk Assessment
Ecolibrium, Fall 78, V7, N4, P4 (4)
Technical Feature: While many scientists agree that most cancer cases are caused by factors external to the human body, regulatory agency reactions that ban any contact with suspected environmental carcinogens may be extreme. There are "no-effect" exposure levels to most substances, and some may even be essential in small amounts. A knowledge of the risks is necessary before regulations are imposed on the public. Much regulation is currently based on studies with mice; scientists and statisticians are finding that variations in such environmental test conditions as diet, dust, noise, and stress may cause background noise in test results, making conclusions drawn from such studies tenuous. Other accepted bioassay techniques should supplement mouse studies to establish the carcinogenic risk of various substances. (ENVL)

Carcinogenic Potency and Risk Assessment
Squire RA
Division of Comparative Medicine, Johns Hopkins
University School of Medicine, Baltimore, Maryland
Food Addit Contam, Vol 1, ISS2, 1984, p221-31
An overview of carcinogenesis risk assessment is presented. The nature of evidence for carcinogenic potential in humans is discussed, including possible carcinogenic mechanisms, genotoxicity and laboratory animal data. Emphasis is given to the importance of including all pertinent evidence in risk assessment, rather than placing total reliance on mathematical extrapolations from animal tumour data. An approach to ranking animal carcinogens according to the weight of evidence is described briefly. (NLM)

Carcinogenic Risk Assessment: A Toxicologist's View
Purchase IF
Imperial Chemical Industries PLC, Alderley Park, Macclesfield,
Cheshire, England
Banbury Rep; 19:175-85 1985
Risk quantitation is but one step in the overall process of risk management that is aimed at protecting the health of those exposed to chemicals. The drive for better quantitative methods of assessing carcinogenic risk has led to the development of a number of mathematical models for extrapolating data derived from animal experiments, usually conducted at high doses, to the risk that is likely to occur with substantially lower exposure levels. Two examples are used to illustrate the way in which simple mathematical extrapolation provides estimates of risk at low dose which are clearly incompatible with the existing knowledge of mechanisms of action or knowledge of epidemiology. In the case of vinyl chloride, mathematical models are

used to extrapolate from each of the animal studies a dose that is likely to produce a risk of one in 10(-6). The range of doses produced was so wide that the utility of the procedure is called into question. In a second example, trichlorethylene carcinogenesis is used to illustrate an instance in which information on the mechanism of carcinogenic action can provide evidence that mathematical extrapolation methods are unsuitable. The evidence of lack of susceptibility of human tissues in vitro, together with knowledge of the nongenetic mechanisms of carcinogenesis for this compound, indicate that the mouse data are unsuitable for risk assessment in man. Risk assessment procedures are discussed under the following headings: hazard identification; hazard assessment; and risk assessment. The single most important attribute of the risk assessment process is that it should provide an accurate assessment of risk. Risk assessment should also share other characteristics of scientific activities, including reproducibility and compatibility with other knowledge. The ability to test the assumptions on which the assessment process is based is also an important attribute. Currently available methods of risk assessment do not have all of these attributes. (23 references) (NLM)

Clues to Cancer Etiology from Time-Related Epidemiologic Observations
Fraumeni J Jr; Blot W
Div. of Cancer Etiology, NCI, Bethesda, MD
Time Related Factors in Cancer Epidemiology.
May 15-17, 1985, Bethesda, Maryland, 1985
Observations of time-related variation in cancer occurrence and in environmental exposures or host factors can often provide insight toward the identification of etiologic agents and assessment of their mechanisms of action. This review provides examples of such observations from recent and ongoing epidemiologic investigations, classifying the studies as descriptive, case-control, cohort, or experimental and noting limitations and advantages of these types of investigations. The examples include: (1) Descriptive analyses of the changing temporal patterns of age-specific breast cancer mortality rates and their relation to temporal variations in childbearing practices and in treatment modalities that affect survival rates at young ages; (2) Case-control analyses of lung cancer and mesothelioma, in which a narrow window of observation limited assessment of latency of shipyard-related malignancy, but did not suggest that the timing was as important as the duration of exposure for lung tumors identified during the fixed ascertainment period, and in which the effects of intensity and age at exposure differed considerably between lung cancer and mesothelioma; (3) Cohort analyses of arsenic-exposed smelter workers, where risk of cancer varied with age started working, age stopped, and calendar time; and (4) Issues in the design and analysis of an intervention trial in an area of China at exceptionally high risk of esophageal cancer, where combinations of nutrients are being evaluated as inhibitors of late-stage events. (NLM)

Definition of a Carcinogen as a Potential Human Carcinogenic Risk
Weisburger JH
Naylor Dana Inst. Dis. Prevent., Amer. Health Found., Valhalla
Jpn. J. Cancer Res. (GANN); Vol ;76, ISS 12, 1985; 1244-6
CBAC COPYRIGHT: CHEM ABS. The data base required for risk assessment and the protection of man against cancer hazards from suspect chems. involves systematic acquisition of data and anal. of the following: (1) structure-activity relations, (2) results

from a battery of short-term in vitro tests yielding data that indicate genotoxicity, and (3) in vivo bioassays indicating a high incidence of malignant neoplasms in mice, rats, and (or) hamsters with a relatively short latent period. Human cancer risks are thereby defined by studies that yield clear pos. results. (NLM)

****The Distinct Health Risk Analyses Required for Genotoxic Carcinogens and Promoting Agents**
Weisburger JH; Williams GM
Naylor Dana Institute for Disease Prevention, American Health Foundation, Valhalla, NY
Environ Health Perspect; Vol 50, 1983, p233-45

Estimating the Risks of Cancer Mortality and Genetic Defects Resulting from Exposures to Low Levels of Ionizing Radiation
Buhl TE; Hansen W
Los Alamos National Lab., NM
NTIS/DE84013855, p117 1984

Estimators for calculating the risk of cancer and genetic disorders induced by exposure to ionizing radiation have been recommended by the US National Academy of Sciences Committee on the Biological Effects of Ionizing Radiations, the UN Scientific Committee on the Effects of Atomic Radiation, and the International Committee on Radiological Protection. These groups have also considered the risks of somatic effects other than cancer. The US National Council on Radiation Protection and Measurements has discussed risk estimate procedures for radiation-induced health effects. The recommendations of these national and international advisory committees are summarized and compared in this report. Based on this review, two procedures for risk estimation are presented for use in radiological assessments performed by the US Department of Energy under the National Environmental Policy Act of 1969 (NEPA). In the first procedure, age- and sexaveraged risk estimators calculated with US average demographic statistics would be used with estimates of radiation dose to calculate the projected risk of cancer and genetic disorders that would result from the operation being reviewed under NEPA. If more site-specific risk estimators are needed, and the demographic information is available, a second procedure is described that would involve direct calculation of the risk estimators using recommended risk-rate factors. The computer program REPCAL has been written to perform this calculation and is described in this report. (Author abstract) (25 Refs) (NLM)

Familial Cancer: Genetically Determined?
(Review)
Weber W; Ott J; Gencik A; Muller H;
Laboratory of Human Genetics, Cantonal Hospital, Basel, Switzerland
Anticancer Res, 3(2):133-42 1983

Many cancers, in both children and adults, cluster in7 families. Collection and statistical analysis of pedigree data suggest that genetic mechanisms play an important role in most cancer types. This is illustrated in colorectal, breast, lung, ovarian, and childhood cancer. Pedigree data are consistent with the hypothesis that cancer is sometimes inherited in an autosomal dominant Mendelian fashion. These rare hereditary cancers might not be different pathogenetically from those arising sporadically. A two-stage model for carcinogenesis provides a framework for the understanding of both forms of cancer. The establishment of registries for familial cancer would be most helpful for cancer risk determinations, surveillance and management programs, identification of new cancer-prone genotypes and etiological family studies. (NLM)

From Biochemical Epidemiology to Cancer Risk Assessment
[Draft, 1986]
Alavanja, M; Aron, J; Brown, C, National Cancer Institute;
handler, J, U.S. Food and Drug Administration

Hazardous Substances and Cancer Incidence: Introduction to the Special Issue on Risk Assessment and Risk Management
Wolf, Katy, Rand Corp. CA
J. Hazardous Materials, Jul 85, V10, N2-3
Journal article: Currently known causes of cancer are identified from epidemiological and animal studies. Epidemiology has its main use in verifying that substances are carcinogens; its utility does not lie in prevention. Possible relationships between the production and use of synthetic substances and cancer are explored, and risk assessment and management technologies are summarized. (ENVL)

High to Low Dose Extrapolation of Experimental Animal Carcinogenesis Studies
Brown CC
National Cancer Inst., Bethesda, MD
Available from National Technical Information Service,
Springfield, VA as NTIS/AD-P003 856/2, 26 p 1984
Quantitative risk assessment requires extrapolation from results of experimental assays conducted at high dose levels to predicted effects at lower dose levels which correspond to human exposures. The meaning of this high to low dose extrapolation within an animal species will be discussed, along with its inherent limitations. A number of commonly used mathematical models of dose-response necessary for this extrapolation, will be discussed. Other limitations in their ability to provide precise quantitative low dose risk estimates will also be discussed. These include: the existence of thresholds; incorporation of background, or spontaneous responses; modification of the dose-response by pharmacokinetic processes. This article is from Proceedings of the Conference on the Design of Experiments in Army Research, Development and Testing (29th) held at Bethesda, Maryland on 19-20 October 1983. (Author abstract) (NLM)

Interpretation and Extrapolation of Chemical and Biological Carcinogenicity Data to Establish Human Safety Standards
Anderson RL; Arnold DL; Carlson RG; Chang C; Clarke MD; Clayson DB; Dai Y; Emerson DV; Fishbein L; Garattini S
Proctor and Gamble Company, Cincinnati, OH
Current Issues in Toxicology. Grice HC, ed. New York, Springer-Verlag, p. 1-152, 1984
EPA Libraries: EJE OTS; ELB Cinn
Call Number: RC268.65.158

The interpretation and extrapolation of animal data for predicting human health effects from carcinogens or chronic toxicants is a complex process involving many uncertainties. Some of the factors involved in the process are outlined, taking into account the relevant chemical and biological properties of the compound of interest and the strengths and limitations of the test systems employed. The principal source of evidence for carcinogenic potential is the chronic toxicity/carcinogenicity bioassay in rodents. A critical review of this procedure is presented, with emphasis on those features that constitute an adequate study by current standards. The salient elements of test design, conduct, and interpretation are outlined. Short-term tests which provide corroborative information are described and their predictive value is discussed. The manner in which the animal metabolizes a chemical can have a marked influence on the toxicity of the chemical. Thus, interpreation of animal studies in the light of pharmacokinetics and metabolism is considered. Synergistic and antagonistic effects are considered as humans routinely come in contact with numerous natural and synthetic chemicals, and may therefore be exposed to more than one potentially injurious chemical at any given time. The present knowledge of carcinogenic mechanisms is reviewed, and their implications in extrapolation to humans are considered. An attempt is made to describe the various chemical and biological properties that may contribute to assessment of carcinogenic risk of chemicals to humans. The establishment of safe and realistic guidelines for human exposure to carcinogens is considered. (844 Refs) (NLM)

Mechanisms of Chemical Carcinogenesis: Recent Advances
Fournier PE; Thomas G
Cinique Toxicologique, Hospital Fernand Widal, Paris
Food Addit Contam, 1(2):73-80 1984

The carcinogenetic risk assessment of veterinary drugs has to be envisaged as part of food toxicology. The authors review the recent discoveries which have proved significant for the toxicologist. Tumours arise from an inherited transformation of normal cells through genotoxic, perigenetic and epigenetic processes. Genotoxic mechanisms are best understood and have led to the development of short-term reference tests. The biochemistry of DNA alterations is being unravelled and permits quantitative estimation of carcinogenetic potencies. Work on the role of oncogenes is providing new clues to the understanding the mechanisms of chemical carcinogenesis. Perigenetic processes deal mainly with DNA repair systems and emphasize the complexity of human genome dynamics. Experimental findings about epigenetic mechanisms are still inconclusive as to their practical implications. Abnormal expression of HLA-antigens at the surface of neoplastic cells has been reported, but its significance is still unknown. In conclusion, the main source of progress in toxicology undoubtedly comes from molecular biology, but experimental results must be interpreted with caution if practical issues are to be derived from them. (53 Refs) (NLM)

Mechanisms of Chemical Interaction in Carcinogenesis (Human, Mice)
Williams JR
Johns Hopkins Oncology Center, 600 North Wolfe St
Room 2-121, Baltimore MD
CRISP/86/ES03644-02
U.S. Dept of Health and Human Services; Public Health Service;
National Inst of Health, National Institute of Environmental
Health Sciences
CRISP Data Base National Institutes of Health
RPROG/CRISP Epidemiological studies on the etiologies of human cancers are exceedingly difficult due to the multiplicity of carcinogens to which humans are exposed, and due to the long latency periods between exposure and the expression of the disease state. The multiplicity of exposures also complicates efforts to predict human cancer risks based on bioassays in which animals are exposed to a single agent. In order to make better predictions for human cancer risks, it is exceedingly important to understand the mechanisms by which low levels of environmental carcinogenic agents interact to promote this disease. We have selected a group of known or suspected carcinogenic agents and propose to measure patterns of interaction for endpoints which are highly correlated with the carcinogenic pathway. Specific agents were chosen based on i) our knowledge of the mechanism by which they produce DNA damage and the type of lesions which result, and ii) either because some of these agents are cancer chemotherapeutic drugs, permitting comparison with human responses, or because the agents are ubiquitous in our environment, and exposures are unavoidable. We propose to examine several endpoints in vitro which include: cytotoxicity, specific locus mutation, sister chromatid exchange, chromosomal aberrations, and inhibition of cell replication kinetics. These last three endpoints will also be studies in vivo and in utero to confirm the validity of in vitro observations. The time interval between exposures is an important parameter in evaluating potential interaction. Our protocols will evaluate both simultaneous and sequential exposure to carcinogenic agents. Simultaneous exposure to interactive agents will determine if acute effects are mitigating, additive or synergistic. Exposures separated by both long (hours) and short (days or greater) intervals will measure how risk factors are affected by histories or previous exposures. These types of data may prove important in predicing human risks involved in exposure to multiple carcinogenic agents. (NLM)

****Mechanisms of DNA Damage and Repair. Implications for Carcinogenesis and Risk Assessment**
Proceedings of a Symposium, June 2-7, 1985, Gaithersburg, MD
Basic Life Sci; 38:1-578 1986
(NLM)

****Mechanisms of DNA Damage and Repair: Implications for Carcinogenesis and Risk Assessment**
Simic, Michael G., Upton, Arthur D. (eds.)
U.S. National Bureau of Standards
New York, Plenum Press, 1986
Type Document: Series: Basic Life Sciences, Volume 38
EPA Libraries: EJB HQ

Multimedia Exposure and Concerns for a Holistic Approach Toward Assessment of Risk for Environmental Carcinogens
Kraybill, Herman F.
Natl Cancer Inst, Div of Cancer Cause & Prevention, Bethesda, MD
Conference title: Exposure to Environmental Agents, their Metabolism, and Mechanisms of Toxicity, Rockville, MD, January 1981
Sponsor: EPA, Task Force on Environmental Cancer & Heart Lung Disease
Source: Journal of Environmental Science and Health, Part A, Environmental Science and Engineering v A17 n 4 1982, p491-497 1982
Keywords: *Carcinogens; Man-environment interaction; Multiple Exposures to Toxic Agents; Exposure-Response Relationships; Risk Analysis; Pesticides; Chemicals Pollution; Health Risk from Exposure to Toxic Agents; Epidemiologic Studies; Food and Diet; Nutritional Surveys (EI)

Non-Regulatory and Cost-Effectiveness Control of Carcinogenic Hazard. The Beginnings: A Methodology for Using Animal Data to Decrease Uncertainty in Human Risk
Crouch EAC; Feller J; Fiering MB; Hakanoglu E; Wilson R
Harvard Univ., Cambridge, MA. Energy and Environmental Policy Center
Sponsor: Department of Energy, Washington, DC
Report No.: DOE/EV/10598-1, Sep 82 12p
Contract No.: AC02-81EV10598
DE83009531

A logical cost effective procedure for assessing carcinogenic risk associated with emerging energy technologies is outlined. All chemicals are assumed to be carcinogenic with a potency that has to be measured. In this scheme a non-carcinogen is a chemical with zero potency. If the carcinogenic potency in animals has not been measured, it may be assumed from an a priori measure. Using estimates of potency, exposure, and an interspecies factor (which also accounts for uncertainties in extrapolating the animal data to man), an estimate of risk and the uncertainty associated with that estimate is made, together with upper bounds on the risk. If the upper bound is small the risk is negligible and can be ignored. If is is large, the exposure at the level proposed should not be permitted. However, further information may be obtained which changes the risk estimate or lowers the uncertainty so that the upper bound on the risk is reduced. Notice that estimation of the uncertainty is as important as estimation of a best value of risk. (ERA citation 08:030532) (NTIS)

****Risk of Carcinogenesis from Long-Term Low-Dose Exposure to Pollution Emitted by Fossil-Fueled Power Plants**
Watson, Donald E.
Lawrence Radiation Lab. Biomedical Div. Livermore, CA.,
Univ. of California, 1970
EPA Libraries: EKB RTP
Call Number: AEC/UCRL-50937

HEALTH RISKS

GENOTOXICITY AND REPRODUCTIVE EFFECTS .... *includes development and reproductive effects; embryo and fetal effects, fertility, exposure during pregnancy, teratogenicity, mutagenesis and mutagenicity; genetics and carcinogenesis; and neoplasia.*

Adverse Effects in Humans and Animals of prenatal exposure to Selected Therapeutic Drugs and Estimation of Embryo-Fetal Sensitivity of Animals for Human Risk Assessment
Khera KS
Health Protect. Branch, Sir Frederick Bant. Res. Cent., Ottawa
Issues Rev. Teratol; Vol 2, 1984:399-507
CBAC COPYRIGHT: CHEM ABS A review with apprx. 570 refs. of teratol. studies in humans and exptl. animals with selected drugs of suspected or known human teratol. potential. Attempts were made to define a predictable relation between the teratogenic or embryotoxic doses in animals and the corresponding doses in humans. (NLM)

****Aneuploidy and Health Risk Assessment: Current Status and Future Directions**
Dellarco VL; Mavournin KH; Tice RR
Environmental Protection Agency, Washington, DC
Environ. Mutagen. v 7:3. 1985. 405-424 p. 424
Type document: Journal article; Numerical data
Subfile: ERA (Energy Research Abstracts)
Contract No. AC02-76CH00016
The US Environmental Protection Agency (EPA) recently sponsored a workshop to discuss (1) the contribution of aneuploidy to human disease and disability; (2) the development of tests for detecting chemicals that induce aneuploidy and the relevance of these tests to human risk, and (3) the current understanding of mechanisms by which aneuploidy arises. This summary is based on the presentations given at the workshop. It is hoped that this summary will stimulate thinking in this vitally important area of risk assessment and contribute to the establishment of priorities for basic research, development of new test methods, and validation of existing test approaches. Such research is needed to enhance the scientific basis for risk assessment for aneuploidy-producing chemicals. (DOE)

Application of Mutagenicity Tests in Assessing Occupational Genotoxic Risks, in: Mutagens in Our Environment
Vainio H; Sorsa M
Prog Clin Biol Res; 109:433-442, 1982
(NLM)

Approach to Risk Assessment for Genotoxic Carcinogens Based on Data from the Mouse Skin Initiation-Promotion Model
Burns F; Albert R; Altshuler B; Morris E
Institute of Environmental Medicine, New York University
Medical Center, NY
Environ Health Perspect; Vol 50, 1983, P309-20
(NLM)

****Assessment of Chemicals Affecting the Male Reproductive System**
Dixon RL
Laboratory of Reproductive and Developmental Toxicology,
National Institute of Environmental Health Sciences, Research
Triangle Park, NC
Arch Toxicol [Suppl]; Vol 7, 1984, p118-27

The reproductive toxicologist must be more concerned with the ability of laboratory models to predict human reproductive hazards and to estimate human health risks. Although more than a hundred chemicals have been reported to affect the reproductive capacity of male laboratory animals, fewer than 15 environmental chemicals have been shown conclusively to affect man and many of these are known mutagens, carcinogens or otherwise generally toxic agents. Pharmacokinetic and adaptive factors must be considered. More attention also needs to be directed towards processes other than spermatogenesis and towards mechanisms of toxicity other than cytotoxicity. The male component necessary for successful reproduction depends on a large variety of biological processes working in concert. The ability to assess chemically-induced reproductive effects needs to be refined and modern molecular and cellular approaches should be developed and validated. This paper summarizes aspects of the pharmacokinetic and adaptive factors involved in testicular toxicity, some current laboratory assessment techniques, and newer test procedures such as monoclonal antibodies for sperm surface proteins and the interspecies (human/hamster) sperm penetration assay. (NLM)

The Assessment of Embryotoxicity Risks in Man-Made Ecology A Permanent Multidisciplinary Inquiry
Kucera J
Marois, M. (Ed.)
Progress in clinical and biological research, Vol. 163B.
Prevention of Physical and Mental Congenital Defects:
Part B: Epidemiology, Early Detection and Therapy,
and Environmental Factors; Proceedings of an International
Conference of the Institut de la Vie, Strasbourg, France,
Oct. 10-17, 1982. XXV:492P.
Alan R. Liss, Inc., New York, NY
Illus. ISBN 0-8451-0184-6; 0 (0). 1985. 69-74
BIOSIS COPYRIGHT: BIOL ABS.RRM Teratogen Congenital
Anomaly Frequency. (NLM)

Assessment of Reproductive and Genetic Monitoring in Occupational Settings: Government Viewpoint
Sakai C
U.S. Environmental Protection Agency, Washington, DC
Prog Clin Biol Res; Vol 160, 1984, p541-9
(Ref: 20) (NLM)

****Assessment of Reproductive and Teratogenic Hazards**
Christian MS; Galbraith WM; Voytek P; Mehlman M
Princeton Scientific Publishers, Princeton, NJ
1983, 160p Illus Bibl. Index
EPA Libraries: EJE OTS; EKB RTP
Call Number: QP251.A86

Section I of this volume includes a statement of the problem, an overview of historical perspectives and a discussion of major incidents that have raised concern about reproductive hazards and deals with hazards presented by environmental substances, pharmaceuticals, radiation and food additives and with practical applications of systems for rapid detection of potential teratogenic hazards. Section II contains the proceedings of two conferences sponsored by the US Environmental Protection Agency (1-3 Oct. 1980, Atlanta, Georgia, 7-10 Dec. 1980, St. Louis, Missouri) and describes in detail a variety of toxicity and screening tests available to assess risk to female reproduction. Reproductive hazards to males are also examined, and the current state of knowledge on estimation of risk to human conceptus from environmental substances is presented. (NLM)

Assessment of Reproductive Risks
Clegg ED; Sakai CS; Voytek PE
Reproductive Effects Assessment Group,
U.S. Environmental Protection Agency, Washington, DC
Biol Reprod; Vol 34, ISS 1, 1986, p5-16

In the regulatory process, the hazards posed by potentially toxic agents to the female and male reproductive systems and to developing young are evaluated by risk assessment procedures. In this paper, toxicity testing and the regulatory process are discussed, with emphasis on risk assessment. The suggested testing protocols of the Pesticide Assessment Guidelines (U.S. EPA) are presented as an example of testing that might be done to produce toxicity data for an agent. Protocols and endpoints that are utilized in testing for reproductive effects are described. Included are acute, subchronic, chronic, and short-term tests. The four components of reproductive risk assessment (hazard identification, dose-response assessment, exposure assess-ment, and risk characterization) are examined. Effects of dibromochloropropane on rabbit testicular parameters are used to demonstrate approaches that could be taken in doing a reproductive risk assessment. Research needs for screening methods, adequate dose-response testing, toxicokinetics, endpoint development, and extrapolation methods are identified. Finally, this paper discusses selected areas in which changes in reproductive risk assessment are anticipated, as well as the mechanism for influencing the nature and extent of those changes. (NLM)

****Assessment of Risk for Embryotoxic Effects of Chemicals by Combined Application of In-Vivo and In-Vitro Test Systems**
Matsumoto N
Twenty-fifth Annual Meeting of the Japanese Teratology Society,
Kyoto, Japan, July 11-13, 1985
Teratology (1985). 2 (3): 19B
BIOSIS COPYRIGHT: BIOL ABS. RRM Abstract mice urethane carcinogenesis lung toxicity liver toxicity (NLM)

****Assessment of Risks to Human Reproduction and to Development of the Human Conceptus from Exposure to Environmental Substances**
Galbraith WM; Voytek P; Ryon MG
EPA-600/9-82-00:158 PP, 1982
(NLM)

****Biases in Research on Reproduction and Women's Work**
Joffe M
Department of Clinical Epidemiology, London Hospital Medical College, UK
Int J Epidemiol; Vol 14, ISS 1, 1985, p118-23
In the investigation of the possible reproductive effects of women's work, it is necessary to take into account the various biases which may occur as a result of the complex interaction between a woman's child-care responsibilities, work status, income and other aspects of her life. This paper distinguishes four effects and suggests methods of avoiding the resulting biases. Research in this area requires special care in design and analysis. (NLM)

Biological Effects of Static Magnetic Fields: A Selective Review with Emphasis on Risk Assessment
Easterly CE
Oak Ridge National Lab., TN
Department of Energy, Washington, DC
NTIS/DE82013350, 78p
Rather than focusing on literature per se, the current study determines the status of magnetic field information that is applicable to risk assessment. Hence, an attempt is made to identify both the literature that is useful to the goal of risk assessment and a framework within which risk assessment methodologies can be derived. From this selected review, it is concluded that three areas exist for which adequate information can be found to begin modelling: disease induction, reproduction and development, and cardiovascular response. The first two are supported by a combination of positive and negative findings and the last by a calculational technique which utilizes the physically well-known principle of flow retardation for a conducting fluid moving through a magnetic field. (ERA citation 07:048110) (NLM)

****Chemical and Biochemical Dosimetry of Exposure to Genotoxic Chemicals**
Wogan GN; Gorelick NJ
Department of Applied Biological Sciences, Massachusetts
Institute of Technology, Cambridge
Environ Health Perspect; Vol 62, 1985, p5-18
Epidemiologic studies designed to evaluate the health significance of environmental chemicals are compromised by the lack of quantitative exposure data for individuals in exposed populations. Monitoring data on levels of compounds in environmental media often represent the only information available, and average population exposure is therefore the only quantitative parameter that can be calculated. Biological monitoring, i.e., measurements on cells, tissues or body fluids of exposed persons, has the objective of defining the so-called "internal dose" or "effective dose" on an individual basis. Such measurements can be used to ensure that current or past exposure does not entail unacceptable health risks, or can detect potentially excessive exposure before the appearance of adverse health effects. Results obtained through this approach can be interpreted on an individual basis and also used to estimate for that individual the amount of chemical absorbed during a specific time interval or the amount bound to critical sites. They may also be useful for characterization of community exposure by analyzing result s obtained in groups of individuals within the general population. In this respect, biological monitoring data complement environmental measurements but have certain advantages in estimating health risks. Most importantly, the data obtained are more directly related to adverse effects and thus provide a better estimate of risk than ambient monitoring. Biological monitoring also takes into account absorption by all routes, integrates exposure from all sources, and therefore can be used as a basis for estimate of total risk from multiple chemicals. (NLM)

****A Comparison of How the United States and Canada Set Drinking Water Regulations**
Calabrese EJ
Division of Public Health, University of Massachusetts, Amherst
Regul Toxicol Pharmacol; Vol 3, ISS 4, 1983, p417-27
How the United States and Canada approach the process and implementation of drinking water standards is critically examined. Despite many similarities in their approaches to regulating drinking water contaminants, there are a number of important differences, including approaches to dealing genotoxic versus presumed epigenetic carcinogens and selection of biostatistical quantitative risk assessment models. Such international comparisons provide a valuable means to discern how others have attempted to solve similar problems and thereby provide an excellent opportunity to test the validity of one's own methodologies. (NLM)

Comparison of Types of Chemically Induced Genetic Changes in Mammals
Adler ID
Institute of Genetics, Neuherberg Federal Republic of Germany
Mutat Res; 115(3):293-321 1983
The present paper reviews the currently available in vivo systems for detection of chemically induced mutations and chromosome aberrations and summarizes the data of the relevant tests for mammalian germ-cell mutations (specific-locus test and heritable

translocation test). The value of in vivo screening tests (somatic mutations and sperm abnormalities) for predicting specific-locus mutations is illustrated by comparing doubling doses. The results from the mammalian germ-cell mutation tests (specific-locus test and heritable translocation test) constitute the base-line for an assessment of predictability. Radiation and chemically induced specific-locus mutations differ in a number of respects, suggesting a need for caution in making risk estimates for chemical mutagen exposures in terms of radiation-equivalent doses. In vivo nondisjunction tests are discussed. Finally, unsolved problems and difficulties in generalizing qualitative and quantitative correlations between test systems are outlined. It is concluded that even qualitative predictions from data on somatic cells to germ cells are at best insecure because germ-cell specificity cannot be foretold, not to mention the fact that quantitative extrapolations from the results of in vivo screening tests, in general, are fraught with even more uncertainties. There is an acute need for collection of more data from studies involving germ cells. (140 Refs) (NLM)

Conference on the Safety Evaluation of Chemicals
Nelson N
New York University, NY
CRISP/86/ES03820-01
U.S. Dept of Health and Human Services; Public Health Service;
National Inst. of Health, National Institute of Environmental
Health Sciences
CRISP Data Base National Institutes of Health

RPROJ/CRISP Here proposed is a series of three Workshop Conferences aimed at examining new and emerging methods for safety evaluation of chemicals; these Workshops lead to published reports in book form. These are conducted by the Scientific Group on Methodologies for the Safety Evaluation of Chemicals, an international organization sponsored by the International Programme on Chemical Safety (IPCS) of the World Health Organization (WHO) which includes the International Labor Organization (ILO) and United Nations Environmental Program (UNEP) and the Scientific Committee on Problems of the Environment (SCOPE) of International Council of Scientific Unions (ICSU). The Group has an international membership which encourages the review of difficult problems relating to methods for evaluating the effects of chemicals on human and non-human biota. These Workshops result in books composed of commissioned, individualy authored papers and a Joint Report. The first Workshop (now available from Wiley Publising Company) dealt with Methods for Assessing the Effects of Chemicals on the Reproductive Functions; the second, about to be published, dealt with Quantitative Risk Assessment; the third, completed in August 1983, is now in final editing and deals with Methods for Assessing the Effects of Mixtures of Chemicals; the fourth, completed in August 1984, is also in final editing and covered the Predictive Value of Short-Term Tests for Non-Genotoxic Effects. Candidate topics are proposed by the Executive Committee of SGOMSEC and chosen in consultation with the Sponsors. Normally, one such Workshop is held each year following 8-10 months of preparatory writing by the invited contributors. A main objective is the specific identification of research needs for the improvement of methods for the safety evaluation of chemicals. (NLM)

Current Concepts in Reproductive Toxicology
Borzelleca JF
Department of Pharmacology and Toxicology,
Medical College of Virginia, Virginia Commonwealth
University, Richmond,
Clin Lab Med; Vol 4, ISS 3, 1984, p461-7

Data in recent decades suggest that reproductive impairment in humans and laboratory animals is associated with exposure to certain chemicals and physical agents, the significance of which has not been clearly defined. The epidemiologic and anecdotal human data suggest that the association or correlation is coincidental or causative. Extensive research is necessary to establish causality. (NLM)

****The Decision-Point Approach for Systematic Carcinogen Testing**
Weisburger JH; Williams GM
American Health Foundation, Naylor Dana Inst.
Disease Prevention, Valhalla, NY
Food Cosmet Toxicol; 19 (5), 1981, p561-566

HEEP COPYRIGHT: BIOL ABS. Advances in the understanding of the mechanisms of chemical carcinogenesis suggest new approaches to the practical aspects of the bioassay of carcinogens and regulatory impact, and to the determination of health risk. Chemical carcinogens have been classified on the basis of their specific properties as genotoxic carcinogens or agents operating by epigenetic mechanisms. Genotoxic carcinogens require distinct qualitative and quantitative types of analysis since their fundamental mechanisms of operation are different from those of epigenetic agents. A systematic decision-point approach to carcinogen testing provides for distinction between genotoxic and epigenetic carcinogens. The first set of data points involves the following: structure-activity relationships;mutagenicity assays in prokaryotes; mutagenicity assays in eukaryotes; tests for induction of DNA repair in eukaryotes; tests for sister chromatid exchange; cell transformation. Not all of these have equal sensitivity, specificity and reliability. The sequence of in vitro tests permits preliminary decision making. As a second series, limited, relatively rapid, in vivo assays involve the following: skin-tumor induction in mice, with and without promotion; lung-tumor induction in mice; breast-cancer induction in rats; identification of early lesions in rodent liver. The data so obtained are considered for decision making and risk analysis. As a last step, a traditional chronic bioassay may be needed only when human exposure to the product is potentially high and/or continuous, or when the above phases of testing have yielded unsatisfactory or, in the case of epigenetic agents, negative results. More research is essential for the delineation of the effects of epigenetic agents, some of which are most important in the etiology of human cancer. (NLM)

****Definition of a Carcinogen as a Potential Human Carcinogenic Risk**
Weisburger JH
Naylor Dana Inst. Dis. Prevent., Amer. Health Found., Valhalla, NY
Jpn. J. Cancer Res. (GANN); Vol 76, ISS 12, 1985;1244-6

CBAC COPYRIGHT: CHEM ABS The data base required for risk assessment and the protection of man against cancer hazards from suspect chems. involves systematic acquisition of data and anal. of the following: (1) structure-activity relations, (2) results from a battery of short-term in vitro tests data that indicate genotoxicity, and (3) in vivo bioassays indicating a high incidence of malignant neoplasms in mice, rats, and (or) hamsters with a relatively short latent period. Human cancer risks are thereby defined by studies that yield clear pos. results. (NLM)

Direct Mutagen Risk Assessment: The Development of Methods to Measure Immunologic and Genetic Responses to Mutagens
Strauss GHS
Health Effects Research Lab., Research Triangle Park, NC
NTIS/PB85-160455, 39p

TD3: The review puts forward the concept of Direct Mutagen Risk Assessment through a discussion of the development of methods with which to measure immunologic and genetic responses to mutagens. Mutagenicity risk assessment, in this context, is the study of human somatic cell mutation occurring in vivo and is considered with attention to ideal criteria for detection of mutant cells. Immunotoxicity is addressed particularly in terms of the possible carcinogenic consequences of impaired cutaneous cell-mediated immunity. A section of this review reports the development and the exploitation of the Strauss-Albertini test for enumerating 6-thioguanine-resistant peripheral blood lymphocyte variants. Another section presents results from a system under development, designed to clone and quantitate mutant lymphocytes taken directly from the body. The Clonal Assay of Lymphocyte Mutagenesis (CALM) can confirm that variant cells are mutant and, potentially, could be used comparatively to measure genotoxicity in human or animal lymphocytes after in vivo or in vitro exposures to mutagens. (NLM)

****The Distinct Health Risk Analyses Required for Genotoxic Carcinogens and Promoting Agents**
Weisburger JH; Williams GM
Naylor Dana Institute for Disease Prevention, American Health Foundation, Valhalla, NY
Environ Health Perspect; Vol 50, 1983, p233-45
(NLM)

****Editorial Introduction to Papers Produced by Committee 4 of ICPEMC on Risk Estimates of Genotoxic Chemicals**
Sobels FH
Mutat Res; 114:91, 1983
(NLM)

****The Effect of Common Exposures on Reproductive Outcomes**
Hogue CJ
Pregnancy Epidemiology Branch, Centers for Disease Control, Atlanta, GA
Teratogenesis Carcinog Mutagen: Vol 4, ISS 1, 1984, p45-57
(NLM)

****Environmental Influences on Fertility, Pregnancy, and Development. Field Studies: Lessons Learned**
Whorton D
Teratogenesis Carcinog Mutagen; Vol 4, ISS 1, 1984, p25-44
(NLM)

****Epidemiologic Detection of Low Dose Effects on the Developing Fetus**
Kline J; Levin B; Stein Z; Susser M; Warburton D
New York State Psychiatric Institute
Environ Health Perspect: Vol 42, 1981, p119-26

Evaluations of the health effects of exposures in the workplace and environment have broadened to include effects on reproduction, as well as on the development of cancer. Models to assess risks associated with varying doses of exposure rest almost entirely on data about cancer. In this paper, we discuss some distinctive features of reproduction which bear on the interpretation of such models, when applied to reproduction, rather than carcinogenesis. Dose-response curves describe the relationship between two exposures (smoking and alcohol drinking) and two outcomes (spontaneous abortion and birthweight) are used to illustrate some of the questions which arise in attempting to determine a "safe" level of exposure. (NLM)

Epidemiologic Study of Reproductive Outcomes and Environmental Exposures
Wilcox A
NIEHS, NIH
CRISP/86/ES44003-08
U.S. Dept of Health and Human Services; Public Health Service;
National Inst. of Health, National Institute of Environmental Health Sciences
CRISP Data Base National Institutes of Health

RPROJ/CRISP The reproductive epidemiology project emphasizes the development and application of new methods for measuring human reproductive damage. Reproductive outcomes include fertility, sub-clinical early fetal loss, spontaneous abortion, fetal growth, and birthweight. Each of these outcomes can be affected by environmental factors, and represents a possible endpoint for studying the effects of toxins on human reproduction. One major component of this project is the study of fertility. Time-to-pregnancy is being developed as a potentially useful and sensitive measure of fertility. For example, a strong relation between smoking and time-to-pregnancy has been documented. Another approach to the measurement of fertility involves the study of daily urine specimens from women who are trying to become pregnant. By comparing the ovarian hormones in cycles which results in pregnancy with hormones in infertile cycles, new methods may be developed for measuring fertility impairment. These methods may be applicable to women not actively trying to conceive. A second component of this project is the study of very early pregnancy loss. In a prospective study of 230 women who have stopped using birth control in order to become pregnant, daily urine specimens are being collected to be tested for evidence of pregnancy. This will provide the best available estimate of the extent of early pregnancy loss in humans. The risk of early loss will be studied in relation to common exposures in this population, such as use of alcohol, tobacco, caffeine beverages and medications. Work continues on the development of a new method for the analysis of birth weight and perinatal mortality. (NLM)

Epidemiologic Study of Reproductive Outcomes and Environmental Exposures
Wilcox A
NIEHS, NIH
CRISP/85/ES44003-07
U.S. Dept of Health and Human Services; Public Health Service;
National Inst. of Health, National Institute of Environmental Health Sciences
CRISP Data Base National Institutes of Health

RPROJ/CRISP The reproductive epidemiology program emphasizes the development and application of new methods for measuring and analyzing human reproductive outcomes. Such outcomes include fertility, sub-clinical early fetal loss, spontaneous abortion, fetal growth, and birthweight. Each of these outcomes can be affected by environmental factors, and represents a possible endpoint for studying the effects of toxins on human reproduction. One major component of this program is a prospective study of early fetal loss among 200 women. Daily urine specimens are being collected from women who have discontinued their use of birh control in order to become pregnant. Urine assays for human chorionic gonadotropin are being used to estimate the risk of early pregnancy loss among these women. A pilot study of the first 30 women enrolled found chemically evidence of four sub-clinical pregnancy losses. Risk of early loss will be studied in relation to common exposures in this population, such as use of alcohol, tobacco, caffeine beverages and medications. Another area of interest is the possible usefulness of measuring fertility through retrospective estimates of time-to-pregnancy. A pilot study using this approach has recently been completed. Another pilot study is in progress that looks for sub-clinical conceptions among women using IUD's as possible measure of human fertility. Work continues on the further development of a new method for the analysis of birthweight. (NLM)

Establishment of Normal Human Liver Epithelial Cell Lines
Tong CC
Braton Biotech, Inc., Hawthorne, NY
CRISP/86/ES03806-01
U.S. Dept. of Health and Human Services; Public Health Service;
National Inst. of Health, National Institute of Environmental Health Sciences
CRISP Data Base National Institutes of Health

RPROJ/CRISP In the assessment of genotoxicity of environ-mental chemicals, a battery approach has been recommended. The testing battery in general includes bacterial and rodent mammalian cells as target organisms. Data generated from our comparative evaluation of these approaches indicated that when comparison of the same or two different well defined endpoints was made but involving different metabolic activation systems, qualitative difference in response was observed. To enable one to rationally and critically evaluate the risk of environmental chemicals to human and to perform the evaluation in an expeditious as well as economical manner, we propose to establish permanent human liver cell lines with the eventual aim of providing a battery of human liver cell lines for risk assessment. Specifically, we propose in Phase I of this project to establish several normal continuously replicating human liver cell lines from human primary hepatocyte cultures. Phase II of this project will be the full characterization and validation of these established human liver cell lines as components of a testing battery for risk assessment. This work is primarily relevant to the programs sponsored by NCI, Cancer Treatment Program, Toxicology--development of human somatic cell mutagenesis system; and by NIEHS. (NLM)

Evaluation of Embryotoxic Risks from Industrial Chemicals During Pregnancy
Spielmann H
Max von Pettenkofer Inst., Bundesgesundheitsamtes Berlin, Berlin
Geburtshilfe Frauenheilkd; Vol. 46, ISS 6, 1986, 335-9
Language: German

CBAC COPYRIGHT: CHEM ABS A review with 19 refs. of industrial chems. (A) known to be embryotoxic in humans, (B) probably embryotoxic, (C) and not embryotoxic at max. concns. permissible for occupational exposure (i.e.,8 h/day, 40 h/wk) (1, 8, and 18 substances, resp.). In group D are carcinogens without max. permissible concns. (112 compds). In group E are 26 compds. under evaluation for embryotoxicity in humans. (NLM)

Evaluation of Genotoxic Effects in Human Populations
Waters MD; Allen JW; Claxton LD; Garrett NE; Huang SL
Health Effects Research Lab., Research Triangle Park, NC
Northrop Services, Inc., Research Triangle Park, NC
NTIS/PB84-128982, 67p

TD3: There are demonstrable associations in experimental animals between DNA damage in somatic cells and the development of cancer, and between DNA damage in germ cells and the incidence of genetic disease in offspring. Thus, there is substantial evidence of the need to detect and to quantitate chemically induced genetic damage in humans in order to assess the potential for cancer and genetic disease. Current methods for estimating human risk of cancer have been based on knowledge of human exposure and epidemiological data. An alternative approach would base such estimates of risk on knowledge of exposure and of damage to the DNA of human cells and tissues. The principal difficulty in performing such assessments lies in the uncertainty of translating information from tests for genetic damage in human cells and tissues into reliable estimates of risk for cancer or genetic disease. This poster concerns: (1) the development of mammalian cell methods that may be used ultimately to evaluate genotoxic effects in humans and (2) our initial attempts to implement a 'parallelogram' approach whereby such methods can be used, collectively, to relate quantitative information on genetic damage to quantitative estimates of risk for cancer or genetic disease. Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, NC. (NLM)

A Framework for Reproductive Risk Assessment and Surveillance

Omenn GS
University of Washington, Seattle
Teratogenesis Carcinog Mutagen; Vol. 4, ISS 1, 1984, p1-14
(NLM)

Genetic and Nongenetic Events in Neoplasia

Stott WT; Reitz RH; Schumann AM; Watanabe PG
Toxicol. Res. Lab., Dow Chemical Midland, MI
Food Cosmet Toxicol; 19 (5), 1981, 567-576

HEEP COPYRIGHT: BIOL ABS. It has become increasingly evident that all chemical carcinogens do not act via the same mechanism of tumorigenicity. Based upon the extent of a chemical's interaction with DNA, a general classification scheme of various mutational and nonmutational theories of chemical carcinogenesis is presented. Compounds that directly interact with DNA are classified as genotoxic, whereas those that do not interact directly with DNA are classified as epigenetic carcinogens. Under each general heading, several mutational and nonmutational mechanisms of carcinogenesis are believed to be possible. Data are presented to support the existence of an epigenetic-mutational theory of chemical carcinogenesis based upon recurrent cytotoxicity. In this case, increased regenerative DNA synthesis in response to tissue injury is believed to result in an enhancement of the normal spontaneous mutation rate, conceivably leading to a cellular transformation. The carcinogenic risk posed by such epigenetic carcinogens appears to differ greatly from that posed by genotoxic carcinogens. Consideration of data concerning the possible mechanism of carcinogenicity of a chemical, along with pharmacokinetic data, will allow a better understanding of bioassay results and a more accurate assessment of carcinogenic risk. (NLM)

Guidance for the Evaluation, Risk Assessment and Control of Chemical Embryo-Fetotoxins

Karrh BW; Carmody TW; Clyne RM; Gould KG; Portela-Cubria G; Smith JM; Freifeld M
Journal of Occupational Medicine; June 1981, Vol. 23, No. 6, p397-399

This review of issues of concern to the occupational health professional and workplace manager covers: scope of the problem; medical issues; assessment of intrinsic embryo-foetotoxic potential; assessment of human exposure; assessment of risk; control of chemicals posing a potential embryo-foetotoxic risk; legal issues. It is concluded that application of the same toxicological considerations and control measures as are used for other chemicals which present different toxic hazards, will prevent, or maintain at safe levels, exposure of susceptible persons to embryotoxins and will not unnecessarily restrict the opportunity for meaningful employment for any class of persons. (NLM)

Identification of Genotoxins in the Industrial Work Environment, In: Chemical Mutagenesis, Human Population Monitoring and Genetic Risk Assessment

Anderson D
Prog Mutat Res; 3:201-224, 1982
(NLM)

****In Vivo Reproductive and Mutagenicity Tests**
Christian MS; Voytek PE
Environmental Protection Agency, Washington, DC
NTIS/PB82-221599

TD3: A review of current in vivo testing systems and procedures used for assessing reproductive and heritable genetic hazards of chemicals is presented. A comparison is made between the similarities and differences in protocols for reproductive effects among the different regulatory agencies in the United States and countries belonging to the Organization for Economic Cooperation and Development. Uses of in vivo mammalian mutagenicity data for assessing potential human heritable genetic diseases risk are also discussed and examples of how in vivo mutagenicity test systems can be used to estimate risk are presented along with explanations of the various assumptions employed. Prepared in cooperation with Argus Research Labs., Inc., Horsham, PA. (NLM)

International Programme on Chemical Safety (IPCS)
Mercier M
World Health Organization, Div of Environmental Health,
Geneva, Switzerland
CRISP/86/ES02617-06
U.S. Dept of Health and Human Services; Public Health Service;
National Inst. of Health, National Institute of Environmental Health Sciences
CRISP Data Base National Institutes of Health

RPROJ/CRISP The International Programme on Chemical Safety (IPCS) was initiated in 1978 as a cooperative venture of three United Nations agencies: the World Health Organization (WHO), the United Nations Environment Programme (UNEP), and the International Labour Organization (ILO). Managed by WHO, the Programme has as its long-term objectives (1) to evaluate scientifically for international distribution the effects of chemicals on human health and the environment, (2) to develop reliable scientific methods for international use in toxicity testing, epidemiological and clinical studies, and risk assessment, (3) to promote and coordinate scientific cooperation among international in-laboratory testing, epidemiological and clinical studies, research on the biological mechanisms of chemical damage and on dose-response, (4) to develop educational models and programmes for toxicology training by WHO member countries, and (5) to develop models and methods for dealing with in-country and international chemical accidents. In addition, the Programme is charged with management of WHO committees which develop guidelines on exposure limits of chemicals in foods, air and water, and collaborated with the UNEP International Registry of Potentially Toxic Chemicals. Using staff and facilities of Lead and Participating Institutions in cooperating countries the Programme has (1) initiated evaluations of the biological and environmental effects of over 50 chemicals or groups of chemicals; (2) developed collaborative international scientific methodological studies in several priority areas (genotoxicity and carcinogenicity testing, prenatal exposures, neurobehavioural toxicity, environmental epidemiology, reproductive toxicology, immunological response to carcinogens); (3) developed a European model for toxicology training and initiated a comparison of this model with the needs of developing WHO member countries and (4) developed draft model programmes for coping with chemical emergencies, as well as providing a variety of associated guidelines, data sheets, health alerts and other publications. Finally, the Programme has provided neutral ground for the first meeting of Western (OECD, ECE) and an Eastern European socialist (CMEA) international organizations for harmonization and synthesis of global approaches to chemical safety. (NLM)

****Laboratory Tests for Human Male Reproductive Risk Assessment**
Overstreet JW
School of Medicine, University of California, Davis, CA
Teratogenesis Carcinog Mutagen; Vol. 4, ISS 1, 1984, p67-82

The criteria for reproductive test selection which were set forth in the beginning of this chapter required that the tests be objective, technically sound, biologically stable, sensitive and feasible. All of the tests which have been discussed can generate objective quantitative data (Table 1). Testicular tonometry appears to be a technically sound procedure which measures a biologically stable parameter, although this remains to be proven. Sperm counts are definitely not a biologically stable parameter. There is insufficient information to judge the biological stability of data obtained from sperm cervical mucus interaction. Data from a number of laboratories suggest that the zona-free hamster egg assay gives stable results when repeated with the same donor, and the tests as performed in specialized laboratories are technically sound at the present time. However, the number of laboratories which can perform the assay is limited. Sensitivity to early toxicity is a very important criterion for test selection. Physical examination does not meet this criterion, endocrine studies do not, and sperm counts do not. Not enough information is currently available to determine the sensitivity of sperm motility assessment. Sperm morphology assessment may be the most sensitive early indicator of reproductive toxicity which is currently available. There is a large body of clinical and basic science literature which suggests that sperm morphology may reflect acute stress effects on the testes. The feasibility of these tests vary. Sperm motility may be feasible only in longitudinal studies in which the video equipment can be set up in a laboratory which is doing repeated assessments. Sperm morphology assessment does not require any specialized equipment in the field. Studies of sperm cervical mucus interaction, for the reasons already stated, remain non-feasible at this time. Tests of sperm-egg interaction are probably feasible if spermatozoa can be shipped to a specialized laboratory for assessment. Thus, there are now a number of new tests for male reproductive function which are available, and which are practical. It is time for this technology to be transferred from the basic science laboratory for application in human reproductive risk assessment. (NLM)

****Measurement of in Vivo Mutant Frequency in Lymphocytes in the Mouse**
Dempsey JL; Morley AA
Dep. Haematol, Flinders Med. Cent., Bedford Park
Environ Mutagen; Vol 8, ISS 3, 1986, 385-91

CBAC COPYRIGHT: CHEM ABS A limiting-diln. cloning technique for quantifying in vivo mutations at the hypoxanthine phosphoribosyltransferase locus in mouse splenocytes was developed. Mouse splenocytes were cultured in round-bottom microwells with irradiated feeder cells, concanavalin A, and a source of interleukin 2 at 5 cells/well in the absence of thioguanine, and at 5 .times. 104 cells/well in the presence of 2.5 mug/mL thioguanine; mutant frequency was calcd. as the ratio of the cloning efficiencies with or without thioguanine. The geometric mean (95% range) for the mutant frequency in 20 mice was 1.54 .times. 10-6 (4.7 .times. 10-7-2.6 .times. 10-6) and whole-body x-irradn. resulted in a dose-related increase in mutant frequency of up to .apprx. 20 times the baseline level. The in vivo murine mutation assay should be a useful system for genotoxicity testing and may be of particular value in establishing risk ests. for human populations exposed to genotoxins. (NLM)

Mechanisms of Chemical Carcinogenesis: Recent Advances
Fournier PE; Thomas G
Clinique Toxicologique, Hopital Fernand Widal, Paris
Food Addit Contam; Vol. 1, ISS 2, 1984, p73-80 (Refs 53)

The carcinogenetic risk assessment of veterinary drugs has to be envisaged as part of food toxicology. The authors review the recent discoveries which have proved significant for the toxicologist. Tumours arise from an inherited transformation of normal cells through genotoxic, perigenetic and epigenetic processes. Genotoxic mechanisms are best understood and have led to the development of short-term reference tests. The biochemistry of DNA alterations is being unravelled and permits quantitative estimation of carcinogenetic potencies. Work on the role of oncogenes is providing new clues to the understanding the mechanisms of chemical carcinogenesis. Perigenetic processes deal mainly with DNA repair systems and emphasize the complexity of human genome dynamics. Experimental findings about epigenetic mechanisms are still inconclusive as to their practical implications. Abnormal expression of HLA-antigens at the surface of neoplastic cells has been reported, but its significance is still unknown. In conclusion, the main source of progress in toxicology undoubtedly comes from molecular biology, but experimental results must be interpreted with caution if practical issues are to be derived from them. (NLM)

Mechanisms of DNA Damage and Repair: Implications for Carcinogenesis and Risk Assessment
Simic MG; Upton AD (Eds.)
U.S. National Bureau of Standards
New York, Plenum Press, c. 1986
Type Document: Series: Basic Life Sciences, Volume 38

Misinterpretations of Results and Creation of Artifacts in Studies on Developmental Toxicity Using Systems Simpler than In Vivo Systems
Neubert D; Blankenburg G; Lewandowski C; Klug S
Inst. Toxikol. Embryopharmakol., Freie Univ. Berlin, Berlin
Prog. Clin. Biol. Res; Vol 171, ISS Dev. Mech. Norm.
Abnorm., 1985, 241-66

CBAC COPYRIGHT: CHEM ABS A discussion is presented of the limitations of in vitro studies for risk assessment of chems. for human prenatal development. In vitro systems are valuable for evaluating the mode of action of known embryotoxic substances and for supplementing in vivo studies. Up to now, only a small area of reproductive toxicol. can be covered by in vitro tests. Since the mechanisms of abnormal mammalian development are only incompletely understood, it is difficult to develop a simple system for the testing of all possibilities of abnormal development. None of the available systems had been properly validated for routine testing or for replacing in vivo testing. (NLM)

Modelling Cellular Responses to Genotoxic Agents (Hamsters)

Wilson JD
Medical College of Virginia, Richmond, VA
CRISP/86/ES02992-03
U.S. Dept. of Health and Human Services; Public Health Service;
National Inst. of Health, National Institute of Environmental Health Sciences
CRISP Data Base National Institutes of Health

RPROJ/CRISP There are areas of significance to human health in which it is necessary or desirable to examine biological effects that involve the interaction of multiple agents. For example, improved cancer treatment may be achieved through the combination of multiple chemotherapeutic agents or the use of several conventional treatment modalities. Similarly, proper assessment of the potential risks posed by the increasing accumulation of hazardous materials in the environment should include the ability to examine the effects of exposure to multiple toxic agents since this is often the situation in nature. Conventional experimental designs and methods of analysis have several disadvantages in these types of studies. The experiments are necessarily large and therefore technically unwieldly and expensive. In addition, the analysis of data rapidly becomes extremely complex as the number of agents increases. The objective of this proposal is to develop and apply mathematical and statistical techniques which comprise response surface modelling to the study of biological effects resulting from exposure to various combinations of chemical and/or physical agents. Response surface analysis has proven to be a useful tool in combination chemotherapy studies using animal models; this will be the first attempt to apply these techniques to in vitro biological systems. Cell lethality, mutation and sister chromatid exchange will be the biological responses examined. These effects will be quantitated in V79 Chinese hamster fibroblasts using standard procedures following exposure of the cells to ionizing radiation, heat and chemicals in various combinations. Aspects of response surface methodology will include selecting the appropriate experimental designs, fitting multidimensional response surfaces to experimental data and exploring the response surfaces in regions of particular interest. A major aim is to use this approach to detect statistically significant interactions that occur between the agents used to produce the various responses. These techniques may result in new ways to improve the technical feasibility and cost effectiveness of in vitro experiments designed to optimize the use of therapeutic agents or to test mixtures of potentially harmful environmental agents utilizing presently available screening systems. (NLM)

Models to Man: Establishment of Reference Points for Estimating Genetic Risk in Man, In: Indicators of Genotoxic Exposure

Mohrenweiser HW; Neel JV
Banbury Rep; 13:471-486, 1982
(NLM)

****Monitoring and Risk Assessments of Exposures to Genotoxic Agents**
Osterman-Golkar S
Acta Pharmacol Toxicol; 49(Suppl 1):12, 1981
(NLM)

The Mouse Spot Test as a Predictor of Heritable Genetic Damage and Other Endpoints
Russell LB
Biol. Div., Oak Ridge Natl. Lab., Oak Ridge
Chem Mutagens; Vol 8, 1983, 95-110

CBAC COPYRIGHT: CHEM ABS The mammalian spot test (MST) and the specific-locus test (SLT) both detect various intragenic and chromosomal changes at marked genetic loci in somatic and germline cells, resp. The assay of scorable genetic events is broader in the MST. The unit mutation rate (i.e., induced rate/locus/mol) for 15 chems. was tested with both the MST and SLT. The MST gave no false negs. for heritable mutations induced in spermatogonial stem cells in post-stem cell stages. The unit rate for MST was, with one exception, greater than or similar to that for the SLT. The SLT provided the more pertinent data for assessment of risk from heritable point mutations, the MST being merely a prescreen. Ancillary results with the MST can provide indicators of cytotoxicity, embryotoxicity, or teratotoxicity, but the magnitude of these effects shows no clear correlation with mutagenic potency. (NLM)

Mutagenicity in Drug Development: Interpretation and Significance of Test Results
Clive D
Genetic Toxicology Laboratory, Wellcome Research Laboratories,
Research Triangle Park, NC
Regul Toxicol Pharmacol; 5(1):79-100 1985

The use of mutagenicity data has been proposed and widely accepted as a relatively fast and inexpensive means of predicting long-term risk to man (i.e., cancer in somatic cells, heritable mutations in germ cells). This view is based on the universal nature of the genetic material, the somatic mutation model of carcinogenesis, and a number of studies showing correlations between mutagenicity and carcinogenicity. An uncritical acceptance of this approach by some regulatory and industrial concerns is over-conservative, naive, and scientifically unjustifiable on a number of grounds: Human cancers are largely life-style related (e.g., cigarettes, diet, tanning). Mutagens (both natural and man-made) are far more prevalent in the environment than was originally assumed (e.g., the natural bases and nucleosides, protein pyrolysates, fluorescent lights, typewriter ribbon, red wine, diesel fuel exhausts, viruses, our own leukocytes). "False-positive" (relative to carcinogenicity) and "false-negative" mutagenicity results occur, often with rational explanations (e.g., high threshold, inappropriate metabolism, inadequate genetic endpoint), and thereby confound any straightforward interpretation of mutagenicity test results. Test battery composition affects both the proper identification of mutagens and, in many instances, the ability to make preliminary risk assessments. In vitro mutagenicity assays ignore whole animal protective mechanisms, may provide unphysiological metabolism, and may be either too sensitive (e.g., testing at orders-of-magnitude higher doses than can be ingested) or not sensitive enough (e.g., short-term treatments inadequately model chronic exposure in bioassay). Bacterial systems, particularly the Ames assay, cannot in principle detect chromosomal events which are involved in both carcinogenesis and germ line mutations in man. Some compounds induce only chromosomal events and little or no detectable single-gene events (e.g., acyclovir, caffeine, methapyrilene). In vivo mutagenicity assays are more physiological but appear to be relatively insensitive due to the inability to achieve sufficiently high acute plasma levels to mimic cumulative long-term effects. Examination of the mutagenicity of naturally occurring analogs may indicate the irrelevance of a test compound's mutagenicity (e.g., deoxyguanosine and the structurally related antiviral drug, acyclovir, have identical mutagenicity patterns). Life-threatening or severe debilitating diseases (e.g.,cancer, severe psychoses, severe crippling arthritis, sight-threatening diseases) may justify treatment with mutagenic or even carcinogenic therapeutic agents (benefit/risk considerations). (NLM)

Murine Lymphocyte SCE Model for Predicting Genotoxic Risk (Mice)
Conner MK
University of Pittsburgh, Pittsburgh, PA
CRISP/86/CA39401-01
U.S. Dept of Health and Human Services; Public Health Service;
National Inst. of Health, National Cancer Institute
CRISP Data Base National Institutes of Health

RPROJ/CRISP Analysis of sister chromatid exchange (SCE) in peripheral blood lymphocytes (PBLs) is commonly used as an indicator of genotoxic exposures of human populations. The primary goal of this proposal is to test the hypothesis: The accumulation of unrepaired SCE-inducing lesions and their persistence in PBLs, produced by repeated chemical exposure, are directly related to the agent's tumorigenic activity. Due to inherent limitations of human studies any association of acute or persistently elevated SCEs in human PBL and genotoxic damage in critical body tissues and/or carcinogenesis is, at best, inferred. Therefore, as a means of testing our hypothesis we describe a parellelogram approach which: 1. Compares murine and human PBL SCE responses to a known carcinogen, L-phenylalanine mustard (L-PAM), and 2. Compares murine PLB SCE responses to responses in other critical tissues following treatment of mice with chemicals of varying carcinogenic activities. For the first part of this study a very large L-PAM treated patient SCE data base is available from a local study. This enables us to design equivalent murine L-PAM treatment protocols in order to determine whether the same general post-treatment trends in SCE responses are observed in human and murine PLSs. In the second part of the study, L-PAM and, if time permits, other alkylating agents will be administered to mice using the established lung adenoma assay protocol. SCEs will be evaluated in PBLs, spleen, lymph node, and thymus lymphocytes at various time intervals (24 hrs - 15 wks) after the last treatment. The following questions will be addressed: Successful evaluation of the proposed animal model will provide the basis for future studies. For example, a chemical which produces ambiguous SCE results in humans can be more completely evaluated at high and low doses in the animal model in order to determine human genotoxic risk. In addition, new chemicals can be evaluated in the animal model in order to predict genotoxic risk prior to widespread human exposure. (NLM)

Occupational Reproductive Hazards: Necessary Steps to Prevention
Infante PF; Tsongas TA
Health Standards Programs, Occupational Safety and Health Administration, Washington, DC
Prog Clin Biol Res; Vol. 117, 1983, p383-90

Although some attention has recently been given to the study of occupational reproductive hazards, little is known about measures being taken to prevent exposure to substances having the potential to cause such problems. In the past, OSHA has promulgated a standard to lower the permissible exposure level to a reproductive toxin as the major focus only after experimental evidence was confirmed in humans. The method of selection of appropriate substitutes is also cause for concern. A chemical known to cause testicular atrophy, cancer, and gene mutations in subhuman test systems and to cause sterility in male workers was replaced with a substance known from experimental studies to cause testicular toxicity, cancer of multiple sites, and gene mutations. Experimental test results need to be addressed from the standpoint of determining presumptive risk to humans. A scheme for setting priorities for reduction of exposure or for consideration of regulation of occupational reproductive hazards also needs to be developed. A policy addressing occupational reproductive hazards may serve as a stimulus for protecting workers from these hazards and for improving scientific research protocols. (NLM)

Occupational Risks of Pesticide Exposure for Females
Swartz WJ
Louisiana State Univ. Medical Center, New Orleans, LA
National Inst. for Occupational Safety and Health, Cincinnati, OH
NTIS/PB84-241645, 16p

TD3: The effects of pesticides on the female reproductive system were studies in chick embryos and mice. Carbaryl (63252) was administered to chick embryos in doses of 1.0 to 10.0 milligrams (mg) for 5 or 12 days. When exposed for 12 days, carbaryl became increasingly embryotoxic and abnormalities such as subcutaneous edema and defects in the hind limbs were observed. Female mice were given 50mg per kilogram (kg) DDT (50293) orally once a week for 4 weeks. They were then treated with gonadotropins. Mice were treated with malathion (121755) using the same protocol as with DDT. Malathion did not affect the number of eggs ovulated in response to gonadotropins. The author concludes that DDT has a significant effect on the female reproductive system. Progress rept. 1 Apr 79-31 Mar 82. (NLM)

Overall Design Considerations in Male and Female Occupational Reproductive Studies
Sever LE; Hessol NA
Pacific Northwest Laboratory, Richland, WA
Prog Clin Biol Res; Vol. 160, 1984, p15-47

Epidemiologic studies are extremely useful for examining the possible relationships between occupational exposures and reproductive outcomes in occupational populations. In this paper, we examine some of the major epidemiologic design considerations in male and female occupational reproductive studies. An important consideration in all epidemiologic studies is to choose appropriate outcome variables. One of the unique characteristics of reproductive studies is the wide range of potential outcome variables:

from problems of infertility, through fetal development, and into childhood diseases and diseases of young adulthood. Usually, it is infeasible to look at all possible outcomes. By omitting certain outcomes, however, important associations between exposure and outcome may remain undetected. Epidemiology relies on observations of populations. Factors in data availability, collection, and analysis, and in study design often limit the inferences that may be drawn. The "exposed" or "at risk" groups are not likely to be randomly selected and the investigator has little control over the exposures of the study population. Unlike experimental investigations, epidemiologic observations are made on individuals exposed to a variety of hazards during their lives. The size of the population available for study is critical. Bias potential confounding factors can be minimized through the use of appropriate matching and/or statistical techniques. Many of the topics discussed here will be expanded in subsequent chapters. Although this paper is designed to assist in planning occupational epidemiologic studies, we strongly recommend that, when attempting to conduct such studies, professional guidance from epidemiologists and biostatisticians be obtained. (NLM)

Policy and Procedures for Using Mutagenicity Data in Assessing Genetic Risk, In: Genotoxic Effects of AirborneAgents
Voytek P
Environ Sci Res; 25:579-588, 1982
(NLM)

Preliminary Investigation of the Parallelogram Concept in Genetic Monitoring and Risk Estimation
Waters M; Allen J; Doerr C; Tabor J; Wilmer J
Health Effects Research Lab., Research Triangle Park, NC
Environmental Health Research and Testing, Inc., Research Triangle Park, NC
Northrop Services, Inc., Research Triangle Park, NC
Chemical Industry Inst. of Toxicology, Research Triangle Park, NC
NTIS/PB86-102332, 16p

TD3: The main objective of genetic monitoring in human health surveillance is to prevent excessive exposure to genotoxic agents and to ensure the safety of the exposed or potentially-exposed populace. To attain fully this objective one must understand low dose exposure and associated effects so as to relate both to long-term health consequences. Experience with radiation has provided the most precise knowledge of the dose-effect relationship, and it is that knowledge that the authors wish to exploit in the present investigation. Over the past few years the laboratory has implemented and further developed several methods for cytogenetic and mutational testing and monitoring. These methods employ periphral blood lymphocytes and fibroblasts to detect chromosomal structural aberrations, sister-chromatid exchanges, and gene mutation at specific genetic loci. (NLM)

Principles for Evaluating Health Risks to Progeny Associated With Exposure to Chemicals During Pregnancy

World Health Organization, Geneva, Switzerland
Environ Health Criteria; 30:1-177 1984

Principles for evaluating health risks to progeny associated with exposure to chemicals during pregnancy are discussed in order to aid in the design and assessment of such studies. Personal tragedies are involved when defects are present at birth or appear later in life, and the need for improved methods for the detection of embryo/fetal toxic agents, the assessment of health risks, and the prevention of unfavorable outcomes in pregnancy is evident. There are many difficulties involved in extrapolating human risk from animal studies. In recent years, it has become clear that consideration of developmental toxicity following prenatal exposure must be expanded to include chemically-induced embryolethality, reduced fetal growth, and functional alterations that may not be expressed until late after delivery. Some chemicals may decrease fertility by causing a loss of the early conceptus, even before pregnancy is suspected. The processes of cellular and morphogenic differentiation, though poorly understood, offer many potential targets for toxic chemicals. The use of laboratory data in defining potential embryotoxic hazards of chemicals and methods of assessing the human risks associated with occupational or environmental exposure to such chemicals are described. Three major areas are covered, including prenatal toxic manifestations, postnatal manifestations, and short-term tests. Background information on the mechanisms of development is provided. Methods of assessing prenatal toxic manifestations are described. Discussions about postnatal events and short-term tests are included. The potential of available tests is reviewed and human risk assessments are considered. Conclusions and recommendations are presented. Explanations of terms used in the document are provided. This document primarily deals with chemical exposures during pregnancy and should be useful to all those concerned with evaluation of chemical safety. (NLM)

****Proposed New Teratogenic Risk Assessment Bioassay System Utilizing Hydrozoans**

Clemens, GR; Martin, VJ
Society of Environmental Toxicology and Chemistry Sixth Annual Meeting 8545010 St. Louis, MO, 10-13 Nov 1985
Society of Environmental Toxicology and Chemisty (SETAC), Rockville MD

No formal proceedings will be published. Many of the papers will be published in the Society journal - Environmental Toxicology and Chemistry. (CPI)

Protecting the Reproductive Health of Workers: Problems in Science and Public Policy

Valentine JM; Plough AL
Boston University
J Health Polit Policy Law; Vol. 8, ISS 1, 1983, p144-63

This paper first reviews the scientific problems involved in assessing the effects on reproductive health of toxic substances in the work environment. It then describes the current status of regulatory policies designed to control workers' exposures to toxins believed to affect reproduction. Finally, the paper discusses the relationship between scientific uncertainty and regulatory strategies. Because demonstrating reproductive health effects is extremely difficult, the assessment of the health risks of exposures, as well as of the economic costs of regulation, is probabilistic. Therefore, uncertainty is inherent in any regulatory decision in this area. And the case of reproductive risks is illustrative of the more general problem of protecting the health of workers within a context of scientific uncertainty, and within a highly charged political environment characterized by anti-regulatory sentiment and industries in economic decline. (NLM)

****Recognition, Evaluation, and Control of Chemical Embryotoxins in the Workplace**
Smith JM; Costlow RD
Rohm and Haas Company, Spring House, PA
Fundam Appl Toxicol; Vol. 5, ISS 4, 1985, p626-33
(NLM)

****Regulatory Aspects of Teratology: Role of the Food and Drug Administration**
Kelsey FO
Food and Drug Administration, Rockville, MD
Teratology; Vol. 25, ISS 2, 1982, p193-9

The Food and Drug Administration is a scientific regulatory agency whose consumer protection activities cover a wide range of products including foods and additives, and pesticide residues on foods; drugs; cosmetics; medical devices; and radiation-emitting electronic products. Amongst its concerns is the possible teratogen effects of regulated products to which the pregnant woman is exposed. The policies and programs of the agency directed toward reducing such risks to the unborn are reviewed. These measures include guidelines for animal reproduction studies and for clinical trials involving women to childbearing potential; labeling of products to disclose known or possible harm to the fetus or embryo; surveillance procedures designed to detect previously unsuspected adverse effects of marketed products; research activities designed to develop better understanding of developmental toxicology and improved techniques for detecting embryocidal and embryotoxic effects; and educational efforts directed both to professionals and the public regarding hazards to the unborn of agency-regulated products. (NLM)

****A Report of the U.S. Environmental Protection Agency Gene-Tox Program. Evaluation of Mutagenicity Assays for purposes of Genetic Risk Assessment**
Russell LB; Aaron CS; de Serres F; Generoso WM; Kannan KL;
Shelby M; Springer J; Voytek P
Biology Division, Oak Ridge National Laboratory, TN
Mutat Res; Vol. 134, ISS 2-3, 1984, p143-58

For the vast majority of chemicals, mammalian germ-line (MG) mutation data do not exist. The question was examined of how best to utilize results of non-MG genotoxicity assays that are included in the Gene-Tox data base to provide information of the likelihood that genetic damage might be induced in and transmitted by the reproductive cells of exposed human beings. Two approaches were used to assess the relative value of different assays for genetic hazard identification. (1) Test results were weighted according to parameters by which an assay resemble those encountered in the potential induction of transmitted genetic damage in mammals. For this purpose, 35 assays were grouped into 16 categories that were assigned weights ranging from 1 to 15; there were 2367 chemicals in the data base. This system was evaluated by comparing the sum of weighted test results for each chemical with the outcome of MG-standard (MGst) tests where such had been reported. (MGst tests used were the specific-locus and heritable-translocation assays [SLT and HTT] for gene mutations and chromosome aberrations, rekspectively.) The weighting system produced ka few false positives with respect to the MGst results. It produced no false negatives, but the available evidence is limited by the circumstance that MGst test have evidently been preferentially performed with chemicals that had alread been shown to be positive in several other assays. (2) Finds from each MGst test were compared with those from each of the other assays in turn, provided that at least 10 chemicals had been tested in both of the assays. There were 11 such comparisons involving the SLT, and 14 such comparisons involving the HTT. The observed concordance was above random expectation in several comparisons, particularly those involving certain mammalian in vivo tests, but in only one case (HTT vs. unscheduled DNA synthesis in the testis) did the degree of elevation approach statistical significance. (NLM)

Reproductive Toxicity Risk Assessment of Chemicals
Rao KS; Schwetz BA; Park CN
Dow Chemical
Veterinary & Human Toxicology, Jun 81, V23, N3, p167(9)
Type Document: Technical Report

The goals of reproductive toxicology are to predict adverse effects in humans from chemical exposure through evidence garnered from animal studies. Factors that must be considered in risk evaluation of environmental agents are discussed. Basic terminologies are produced and data are statistically evaluated. (9 Refs., 1 Table) (ENVL)

****Reproductive Toxicology**
Dixon, RL
New York, Raven Press, 1985
Type Document: Series: Target Organ Toxicology Series
Keywords: Genetic Toxicology; Reproduction/Drug Effects;
Health Risk Assessment
EPA Libraries: ELB Cinn
Call Number: RA1224.3.R46 1985

Risk and Reason, Risk Assessment in Relation to Environmental Mutagens and Carcinogens
Proceedings of a Satallite Symposium to the Fourth
International Conference on Environmental Mutagens, Oslo, Norway,
June 21-22, 1985.
Prog Clin Biol Res; 208:1-189 1986
(NLM)

****The Role of Genotoxic Carcinogens and of Promoters in Carcinogenesis and in Human Cancer Causation**

Weisburger JH; Wynder EL

Naylor Dana Institute for Disease Prevention, American Health Foundation, Valhalla, NY

Acta Pharmacol Toxicol (Copenh); Vol 55 Suppl 2, 1984, p53-68 (REF: 67)

The majority of human cancers have multifactorial environmental causes stemming mainly from lifestyle factors such as use of tobacco products through cigarette smoking, snuff dipping, or chewing, and specific nutritional elements and dietary practices. The mechanisms of these lifestyle factors can be analyzed in terms of specific genotoxic carcinogens, and of epigenetic agents or promoting factors. Tobacco and tobacco smoke contain not only genotoxic carcinogens but also, with a more important ultimate effect, cocarcinogens and promoters. Alcohol acts as a cocarcinogen with tobacco, possibly by modifying the metabolism of carcinogens in select organs. Genotoxic carcinogens as nutritional factors may be found in pickled, salted, and smoked foods and may be responsible for gastric cancer. Vitamins C and E and other antioxidants are effective inhibitors. Other types of genotoxic carcinogens are mutagenic chemicals found in broiled and fried foods, and these may be involved in cancer of the colon, breast, and prostate. Promoting effects derive from a high level of dietary fat, which has been linked epidemiologically and through laboratory studies to a higher risk for these cancers. Possible mechanisms by which fat exerts its effects are an increased concentration of bile acids in the stool, as related to colon cancer, and which may be countered by a high cereal fiber diet, to increase stool bulk. In relation to breast or prostate cancer, fat may exert its effect on complex hormonal balances, and also on membrane composition. These promoting effects, whether associated with tobacco smoke or nutrition, are highly dose-dependent, and provided the insult is not too far advanced, reversible. Thus, lowering the dosage, or eliminating the effect as in smoking cessation should have an appreciable effect in reducing overt disease development, and do so fairly promptly. This may apply also to a reduction of second disease in cases where a first occurrence has been successfully treated by conventional means. (NLM)

****The Role of Surveillance in Monitoring Reproductive Health**

Rosenberg MJ; Halperin WE

National Institute for Occupational Safety and Health, Centers for Disease Control, Cincinnati, OH

Teratogenesis Carcinog Mutagen: Vol 4, ISS 1, 1984, p15-24 (NLM)

****Screening of Potential Reproductive Toxicants by Use of Porcine Granulosa Cell Cultures**

Haney AF; Hughes SF; Hughes CL, Jr.

Duke Univ. Med. Center, Durham, NC

Toxicology; 30 (3). 1984. p227-242

HEEP COPYRIGHT: BIOL ABS. While 60,000 chemicals are in widespread use with 1,000 new chemicals introduced into the environment each year, the biologic effects of these agents are poorly understood. With the specific goal of testing for potential reproductive toxicity, methodology was established for the screening of compounds in vitro by measuring effects on progesterone production by porcine granulosa cells in culture. Granulosa cells were harvested by mechanical agitation, cryopreserved and cells with known progesterone production by porcine granulosa cells in culture. Granulosa cells were harvested by mechanical agitation, cryopreserved and cells with known progesterone production capacity utilized for culture. Agents to be tested were added to cultures of 105 cells and the media assayed for progesterone by radioimmunoassay. Estradiol suppression of protesterone production was easily demonstrated in this system and utilized as a verification of responsiveness. The pesticide o, -p-DDT and its isomer p,p-DDt produced dramatic suppression of progesterone production apparently with equal potencies to estradiol. The pesticides malathion, parathion and dieldrin and the fungicide hexachlorobenzene were without effect in this test system. Rapid and efficient screening of potential reproductive toxicants can be performed with the porcine granulosa cell culture system. Mechanisms by which toxicants produce their effect in the system are not elucidated although both estrogenic and non-estrogenic actions must be considered. Since granulosa cells play a central role in mammalian reproduction, this screening system in vitro should aid in identification of agents at high risk for reproductive effects. Eventual utility Eventual utility of this screen will depend on confirmation of reproductive hazard in vivo of agents identified as toxic in vitro, and dieldrin and the fungicide hexachlorobenzene were without effect in this test system. (NLM)

Short-term Tests in the Framework of Carcinogen Risk Assessment to Man

Kroes R

Institute CIVO-Toxicology and Nutrition TNO, Zeist, the Netherlands

Ann NY Acad Sci; Vol. 407, 1983, p398-408

Short-term tests designed to detect possible carcinogenicity have been extensively refined during the last years. Presently, many more or less simple and convenient systems are available to detect mutations, chromosome effects, DNA damage, and malignant transformation. Although their relevance to carcinogenicity is often reasonably good, inconsistencies in the pattern of response indicate that their role as predictive indicators of carcinogenicity is still uncertain. The use of short-term tests in carcinogen risk assessment does seem feasible. These tests, however, should not be the only characteristic taken into consideration in such a risk assessment. Other characteristics such as chemical structure, biotransformation, and pharmacokinetics, qualitative and quantitative physiological and/or morphological effects, species, strain, and organ specificity, dose-response relation, and information on human studies, if available, are of importance too. Current knowledge does not permit a rigid classification of carcinogens, but does warrant a subclassification into genotoxic and nongenotoxic compounds. Whereas for genotoxic compounds a real threshold cannot be expected on a theoretical basis, the existence of a threshold may well be expected for nongenotoxic compounds. In conjunction with other characteristics it may then be decided whether a genotoxic or nongenotoxic compound may be or may not be permitted in the human environment. In this evaluation process it is anticipated that for genotoxic compounds other extrapolation systems should be used, as compared to nongenotoxic compounds, where in fact a conventional food toxicology safety factor may be applied. Short-term tests are very important in the subclassification with respect to genotoxicity and seem to be of value for the detection of promoter activity as well. (NLM)

Statistical Methodology and Analysis of Mutagenesis Testing Data

Margolin BH; NIEHS, NIH

U.S. Dept of Health and Human Services; Public Health Service;

National Inst of Health, National Institute of Environmental Health Sciences

CRISP Data Base National Institutes of Health

RPROJ/CRISP During the last decade the science of genetic toxicology has experienced dramatic growth in its volume of experimentation, its variety of assays and its level of public awareness. This growth, in all its dimensions, is attributable to the ability of these short-term tests to detect, rapidly and relatively inexpensively, environmental agents that are genotoxic. These agents are thought to be implicated in such diverse human health problems as cancer, aging and birth defects. Scientific research in genetic toxicology, however, is far from mature; much remains to be achieved in terms of understanding the precise implications of results from such tests for the assessment of risks to human health. To this end, it is important that there be objective methods of analysis of assay system test results, so that subjective assessments do not significantly interfere with the evaluation of the relative merits of short-term tests. Thus, development of appropriate statistical techniques for the analysis of data arising from short-term assays remains the primary goal of this project. In addition to the development of statistical analyses, an increasing amount of attention has been paid to: (i) methods for meaningful assay validation and (ii) the exploitation of large databases for the assessment of interlaboratory and interassay concordance. In response to the heightened interest in in vivo mechanisms of genetic toxicity, this project has been broadened to include study of a number of in vivo tests. Efforts have also been expended to explore those issues that are uniquely characteristic of genetic toxicity studies of human subjects, an area of increasing research activity. (NLM)

Systematic Account and Critical Appraisal of Current Epidemiological Approaches for Monitoring Reproductive Outcome in Industry

Carlo GL

Department of Epidemiology, Dow Chemical, Midland, MI

Prog Clin Biol Res; Vol. 160, 1984, p139-45

(NLM)

The Teratogenic Risk

Tuchmann Duplessis H

Faculte' de M'edecine, Laboratorie d'Embryologie, Paris, France

Prog Clin Biol Res; Vol 117, 1983, p245-58 (REF: 32)

Reproduction can be impaired in animals and man by drugs and various environmental agents. Depending on the time of exposure--from fertilization through the fetal period and eventually during lactation--the consequences can range from embryotoxicity, gross malformations and a large variety of more subtle morphological, biochemical, and functional abnormalities. The high susceptibility of the embryo to exogenous agents is due to cellular multiplication and differentiation and to the lack of development of the enzyme systems necessary for the detoxification of chemicals. At present, developmental impairments represent the main cause of perinatal mortality and postnatal morbidity. After a review of prenatal physiology and teratogenic principles, the action of selected drugs and environmental agents is analyzed. The potential danger of environmental factors during intrauterine development is of particular concern because of its irreversible nature. (NLM)

Tissue Doses in Man: Implications in Risk Assessment
Golkar SO
Dep. Radiobiol., Univ. Stockholm, Stockholm
Dev. Toxicol. Environ. Sci.; Vol 11, ISS Dev. Sci Pract. Toxicol, 1983, 289-98

CBAC COPYRIGHT: CHEM ABS The possibility of using binding to blood proteins, esp. Hb, for the detection and in vivo dosimetry of genotoxic compds. was investigated. The method utilized the high-resolving power of chem. anal. and could, because of its applicability to animals and man, provide translation factors for risk estn. (NLM)

Toxicologic Effects of Air Pollution on Reproduction, Epidemiological Studies - Literature Review
Nordstroem S; Forsberg B
Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE
NTIS/DE83751429, U.S. Sales Only., 39p

TD3: Air pollutions include a number of toxic agents emitted from fossil fuels (NOsub (x), SO sub 2, CO, POM heavy metals). Epidemiological studies of health effects from such pollutions have been performed concerning lung cancer and cancer mortality, diseases in the respiratory and circulatory systems, infant mortality and total morbidity/mortality. Very few studies on reproductive hazards (except for effects from tobacco smoke) have been presented in the literature. This is noticeable, as the embryo or the fetus is more sensitive to toxic factors than children and adults. The first trimester in utero, including the organogenesis, is the most sensitive period. Even the last trimester of pregnancy is, however, a sensitive period, in that we have increasing evidence that toxic agents may cross the placenta and affect the growing and developing fetus. Epidemiological studies performed, suggest that in populations living in polluted areas, there are effects on fertility, fetal mortality, and birth weights. In Swedish studies decreased birth weights were found in polluted areas especially in later pregnancies (>2). The significance of this pregnancy order effect is so far not known. Thus, increased levels of air pollutions may involve increased risks of fertility problems and fetal damage. Consequently, continuous risk evaluations and risk estimates should be imperative. (ERA citation 09:003408) In Swedish. (NLM)

Types of Exposure Models and Advantages and Disadvantages of Sources of Exposure Data for Use in Occupational Reproductive Studies
Lemasters GK; Selevan SG
Department of Environmental Health, University of Cincinnati, OH
Prog Clin Biol Res; Vol. 160, 1984, p67-79 (REF:20)
(NLM)

****Use of Animal Models for Detecting Specific Alterations in Reproduction**

Amann RP
Animal Reproduction Laboratory, Colorado State University,
Fort Collins, CO
Fundam Appl Toxicol; Vol 2, ISS 1, 1982, p13-26 (REF: 59)

Conventional tests of reproductive toxicity may fail to detect the effects of some agents altering reproductive functions in the male or female. A valid study of reproductive toxicity must be based on a sound understanding of the underlying reproductive physiology, use of sensitive and precise analytical methods, a powerful experimental design, and evaluation of multiple criteria in both the male and female. Potential sites and mechanisms of action of an agent affecting reproduction were considered together with approaches for tests that might be used. Development of new in vitro tests, based on procedures used for probing reproductive physiology, would be desirable. Procedures for detecting alterations in male reproductive function using animal models were considered in detail. For example, spermatogenesis is a long process and a toxic agent may alter functionality of a testicular cell-type several days or weeks before this toxicity is detectable as a change in spermatogenesis is a long process and a toxic agent may alter functionality of a testicular cell-type several days or weeks before this toxicity is detectable as a change in spermatogenesis. Several weeks or months may pass before a detectable change in semen occurs. Therefore, tests utilizing appropriate animal models should have a duration that is six times the duration of one cycle of the seminiferous epithelium. Evaluations of male reproductive function would be enhanced by including determinations of testicular spermatid reserves, selected simple but precise and meaningful quantitative evaluations of testicular histology, determination of the number of sperm within the distal half of the epididymis, evaluation of the progressive motility and morphology of sperm from the distal end of the epididymis, and measurement of the concentration of follicle stimulating hormone in blood. For rabbits, longitudinal analyses of seminal quality are important. (NLM)

Use of Cytogenetic Endpoints in Human Lymphocytes as Indicators of Exposure to Genotoxicants

Preston RJ
Oak Ridge National Lab., TN
Department of Energy, Washington, DC
NTIS/DE85001262, 22p

TD3 The utility of the lymphocyte assay for chemical is discussed, with reference to the underlying mechanisms of induction of chromosome alterations. Possible ways of increasing the sensitivity of the assay in order to make it more useful for population monitoring are also discussed. (Refs. 28) (ERA citation 09:050630) Symposium on new approaches in toxicity testing and their application to human risk assessment, St. Louis, MO, 14 Sep 1983. (NLM)

****Workshop Proceedings: Approaches for Improving the Assessment of Human Genetic Risk--Human Biomonitoring**

Fowle JR, III
Environmental Protection Agency, Washington, DC,
Office of Health and Environmental Assessment
Report No.: EPA/600/9-84/016, Aug 84,59p
Type document: Conference proceeding
NTIS No. PB85-103018/XAB

Federal laws require a consideration of adverse health effects, including mutagenicity, in arriving at regulatory decisions on chemical substances. Certain laws require balancing the consequences of these risks with the benefits provided by the use of chemical substances. This requires that risk be quantitatively assessed. Estimates of human genetic risk can be made indirectly based on data from animal experimentation and human somatic cells, but it is not practical to estimate genetic risk directly based on data from human germ cells. The indirect estimates are highly debated because of uncertainties about interspecies and interorgan extrapolations. Uncertainties in extrapolating from effects observed in animals at high experimental doses to effects likely to occur in humans at much lower environmental levels further complicate genetic risk assessment. Comparative studies are needed to define the relationships between somatic cell and germ cell events and between experimental animals and humans. This may involve selecting at least one high risk human population for study. These efforts will require a long-term coordination of efforts among the Federal agencies and among government agencies industrial concerns, and the academic community.

HEALTH RISKS

NEUROTOXICITY

Animal Models of Neurological Disease
Anderson SM
NINCDS, NIH
CRISP/86/NS02264-09
US Dept of Health and Human Services; Public Health Service;
National Inst. of Health, Natl. Inst. of Neuro. and Communicative
Disorders and Stroke
CRISP Data Base National Institutes of Health
(NLM)

****Behavioral Toxicology in Risk Assessment: Problems and Research Needs**
Mitchell, CL; Tilson, HA
Laboratory of Behavioral and Neurological Toxicology,
National Institute of Environmental Health Sciences,
Research Triangle Park, NC
CRC Crit. Rev. Toxicol. V. 10:4, Oct 1982.98 265-274 p.

Behavioral methods are being used with increasing frequency in toxicology to assess the deleterious effects of chemicals to which we are exposed. The impetus for the use of behavioral techniques in risk assessment resulted from the presumption that they were more sensitive than other tests in detecting toxicity. A more logical reason for the use of behavioral tests is the fact that behavior is the functional indicator of the net sensory, motor, and integrative processes occurring in the central and peripheral nervous system. Thus, the functional capacity of the nervous system cannot be determined independent of behavioral analysis. Some of the problems confronting behavioral toxicology are (1) the translation of human subjective complaints into behavioral tests in animals; (2) determining subtle effects on the nervous system in the face of the well-known functional reserve and adaptability of the system; (3) dealing with the variety of statistical problems resulting from the use of multiple tests, multiple measurements using the same test and the (relatively) large variability inherent in some behavioral phenomena; and (4) selecting the proper tests. Three critical research needs in behavioral toxicology as they relate to risk assessment are (1) development and validation of methods, (2) determining subpopulations at greatest risk, and (3) developing a strategy for determining interactions between two or more agents. (DOE)

****A Computer-Administered Neurobehavioral Evaluation System for Occupational and Environmental Epidemiology. Rationale, Methodology, and Pilot Study Results**
Baker EL; Letz R; Fidler A
Occupational Health Program, Harvard School of Public Health, Boston, MA
J Occup Med; Vol 27, ISS 3, 1985, p206-12

To facilitate the conduct of epidemiolgic studies of populations at risk for or suffering from central nervous system (CNS) dysfunction due to environmental agents, a computer-administered neurobehavioral evaluation system has been developed. The

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system includes a set of testing programs designed to run on a microcomputer and questionnaires to facilitate interpretation of results. Standard tasks evaluating memory, psychomotor function, verbal ability, visuospatial ability, and mood were selected and adapted for computer presentation following the recommendation of an expert committee of the World Health Organization and the National Institute for Occupational Safety and Health. In two pilot surveys, test performance was found to be influenced by age, education level, and socioeconomic status in ways consistent with prior research findings. Performance on tests of short-term memory and reaction time was negatively correlated with intensity of organic solvent exposure among industrial painters. In view of the ease of administration and data handling, high subject acceptability, and sensitivity to the effects of known neurotoxic agents, computer-based assessment of CNS function holds promise for future epidemiologic research. (NLM)

Neurobehavioral Testing of Chemicals: Impact on Recommended Standards
Anger WK
National Institute for Occupational Safety and Health,
Division of Biomedical and Behavioral Science, Cincinnati, OH
Neurobehav Toxicol Teratol; Vol 6, ISS 2, 1984, p147-53

Historically, the American Conference of Governmental Industrial Hygienists (ACGIH) has served as a major source of information on recommended safe exposure limits (Threshold Limit Values or TLV's) for chemicals most frequently encountered in U.S. industry and of known toxicologic significance. A review of the ACGIH Documentation book, which details the basis for their judgements, has indicated that 167 of the 588 chemicals for which they assigned recommended standards have, as one of their bases, direct nervous system effects. In order to increase the impact of future behavioral toxicology research on recommended standards, the neurotoxicologist can utilize certain strategies: (a) Focus on established mixtures in the environment of interest or select exposures of particular chemical classes, considering population size and severity of effect; (b) Ensure that the results of the study are referable to the expected route of exposure in the environment of interest; and (c) Select tests with face validity for non-psychologists, using reference substances. Finally, the neurotoxicologist is urged to consider effects related to safety as well as health in developing his/her research. (NLM)

Cross Species Extrapolation and Hazard Identification in Neurotoxicology
Dyer RS
Neurophysiology Branch, U.S. Environmental Protection Agency,
Research Triangle Park, NC
Neurobehav Toxicol Teratol; Vol 6, ISS 6, 1984, p409-11
(NLM)

Occupational Neuropathy--Mechanism, Detection, Treatment (Human, Animals)
Spencer PS
Albert Einstein College, Bronx, NY
CRISP/86/OH00851-06
US Dept of Health and Human Services; Public Health Service;
National Inst of Health, National Institute for Occupational Safety
and Health
CRISP Data Base National Institutes of Health
RPROJ/CRISP This is a combined experimental and clinical study of the occupational neuropathy induced by repetitive overexposure to acrylamide monomer. The experimental portion (90% of workload) continues from previous studies which suggest the neuropathic potency of acrylamide is linked to toxic inhibition of certain glycolytic enzymes which are required for the maintenance of axonal transport and nerve-fiber integrity. Proposed studies are designed to test this hypothesis. A tissue-culture model of acrylamide neuropathy will be developed and used to study acrylamideinduced degeneration of living nerve fibers in vitro. Selected drugs (e.g., substrates and inhibitors of glycolysis and Krebs cycle) will be tested for their ability to modify the neurotoxic response to acrylamide in vitro. Agents which protect by delaying or preventing the onset of nerve fiber degeneration in culture will be tested for their effects on mice repeatedly treated with acrylamide. Initial studies will employ dietary supplementation with sodium pyruvate, an effective therapeutic regimen in rats treated with acrylamide. Treated and control animals will be assayed for neuropathy by quantitative functional, morphological and biochemical assays. The relationship between molecular and cellular mechanisms of acrylamide neurotoxicity will be examined by determining the effects of single and multiple doses on energy-dependent axonal transport. Dose dependent decrements in fast retrograde transport will be examined in sensory and motor axons and their relationship to changes in fast anterograde transport and distal axonal degeneration determined. The fate of vulnerable glycolytic enzymes transported slowly from neuronal perikaryon to nerve terminal will be examined in the optic nerves of rabbits with advanced acrylamide neuropathy. Finally, studies in rats will examine the current hypothesis that acrylamide induces damages to axons by direct toxic action on nerve fibers. Rates of binding of acrylamide to proteins in peripheral nerves will be determined with the aid of radiolabeled toxin. The clinical portion (10% of workload) will explore the efficacy of the newly developed Optecon Tactile Tester to monitor worker populations at risk for acrylamide and related neuropathies. The major goals of these studies are to develop experimentally proven methods to diagnose, prevent and treat individuals with acrylamide and related occupational neuropathies. These studies respond to some of the research needs specified in the National Institute of Occupational Safety and Health Criterion Document for Acrylamide (1976). (NLM)

ECOLOGICAL RISKS

****Aquatic Hazard Assessment: Concepts and Application**
Kimerle, Richard A.
Monsanto Co, St. Louis
Presented at Intl Joint Comm Hazard Assessment Sym, Ann Arbor,
Apr 9-11, 79, p221(10)
Technical feature: Numerous approaches and procedures now exist for evaluating the aquatic safety/hazard of chemicals. Some of these evaluation schemes are surveyed, and their flaws and inconsistencies are identified. Needs in hazard assessment process development are discussed. Applications of such techniques are also considered. (5 diagrams, 3 graphs, 4 references) (ENVL)

****Ecosystem Risk Analysis**
O'Neill, RV et al.
Environmental Toxicology and Chemistry 1982
V. 1:167-177

****Effects of Pollutants at the Ecosystem Level**
Sheehan, Patrick J.
International Council of Scientific Unions. Scientific Committee
on Problems of the Environment (SCOPE)
New York, Wiley, 1984
Type document: Series: SCOPE Report No. 22
EPA Libraries: EJE OTS; EKB RTP; EKC GBreeze; ELB Cinc.;
ELD Duluth; ESB Corv.
Call Number: QH545.A1E33

****Estimating Hazard**
Cairns, John Jr.
Virginia Polytechnic Institute, Blacksburg, VA
Bio Science 1980. V.30(2):101-107

****Estimating the Hazard of Chemical Substances to Aquatic Life**
Carins, John; Dickson, Kenneth L.; Maki, Alan W.
Virginia Polytechnic Inst & State Univ.
Hydrobiologia, Jun 1, 79, V64, N2, P157(10)
Technical Report: The state of the art of assessing hazards from chemicals to aquatic life is reviewed. Safety, hazard, and risk concepts involved in such assessments are discussed. A conceptual framework for conducting a hazard assessment is presented.

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Various toxicity tests and procedures for evaluating hazards in aquatic life are compared. Decision criteria used in these procedures are tabulated. Safety factors (i.e., uncertainty factors) are the basis for a sequential testing approach in which estimates of expected chemical concentrations in the environment and of their effects can be made with an increasing degree of accuracy and confidence. Further refinements of hazard assessment procedures are needed. (1 graph, 6 references, 3 tables) (ENVL)

****Evaluating Environmental Exposure Through Innovative Biological Tests**
Eaton J; Anderson DR
Risk assessment in aquatic ecology; proceedings
Environmental Protection Agency, Duluth, MN
Envirotest, Seattle, WA
Feb 1986. 1.15-1.27 p
EPRI workshop on risk assessment in aquatic systems,
Albuquerque, NM 13 Apr 1983
Availability: Research Reports Center, Box 50490, Palo Alto, CA
Report No.: EPRI-EA-4438; CONF-8304100
Type document: Analytic of a Report; Conference literature Standardization of aquatic toxicology test procedures, while useful in many regards, has tended to inhibit development of innovative biological testing that could provide a better basis for evaluating aquatic hazards posed by toxic agents. Reliance on the routine techniques has fostered complacency among aquatic toxicologists and discouraged interdisciplinary exchange of different types of relevant information. One of the ways hazard evaluation could be improved is through the application of more fate information to toxicity test design. Fate data describe the nature of the exposure of organisms to a toxicant in the field. Indeed, it may not be appropriate in the case of most test materials to do any biological testing until an adequate fate profile is available. Development of such a profile requires the cooperation of chemists, biologists and modelers to determine the important elements that should be included in each analysis (i.e., to define adequate). In some cases sufficient data for profiles are already available that have not been utilized in selecting and designing tests. Fate profiles could be quite general -- related to the major environmental characteristics of entire categories of toxicants -- or could be very specific. The important aspect is not in the development of the fate profiles themselves, but in how they would drive development of new or modified biological tests. One or more of several unique biological test conditions might be incorporated into these test designs, their selection being based on field exposure parameters. Several examples are described where knowledge or estimations of fate have resulted in more relevant biological tests or in more appropriate hazard evaluations. (DOE)

****Extrapolating from the Laboratory to the Field: How Uncertain Are You?**
Suter, GW II, et al.
American Society for Testing and Materials
Aquatic Toxicology and Hazard Assessment: Seventh Symposium.
ASTM STP 854. 1985, 400-413 pp.
This paper describes some of the pitfalls associated with extrapolating laboratory data to field conditions as revealed by the application of risk analysis methods to ecological

effects of toxic materials. While hazard assessment is concerned with determining the acceptability of particular concentrations or releases of toxicants, risk analysis attempts to derermine the probability that a particular release will cause a particular level of effect. For example, a risk analysis might attempt to determine the probability that the routine effluents of a synfuels plant will cause a 25% reduction in the biomass of commercial and game fish [1]. Thus risk analysis is concerned with what we expect will happen and how likely we are to be wrong.

****Fundamentals of Aquatic Toxicology: Methods and Applications**
Rand, Gary M; Petrocelli, Sam R
Washington, DC, Hemisphere Publishing Corp, 1985
EPA Libraries: EJE OTS; EKA R4; EKC GBreeze; ELB Cinn;
ELD Duluth; EOA R8
Call Number: QH90.57.B5F86

****Hazard Evaluation Division. Standard Evaluation Procedure.**
Ecological Risk Assessment
Urban, Douglas J.; Cook, Norman J.
Washington, DC, EPA, June 1986
Type Document: Report
EPA Report No. EPA 54019-85-001
NTIS No. PB86-247657
State-of-the-art techniques for ecological risk assessment with procedures, philosophies, and extrapolative techniques as used in the Ecological Effects Branch, Hazard Evaluation Division, Office of Pesticide Programs, EPA. Risk assessment procedures are described for pesticide uses proposed for registration under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, 7 U.S.C. 136 et seq.
EPA Libraries: EJB HQ

****Limitations of Laboratory Bioassays and the Need for Ecosystem Level Testing**
Kimball KD; Levin SA
Bio Science. 1985. v.35(3):165-171

New Perspectives in Ecotoxicology
Levin, Simon A. (ed.)
Ecosystems Research Center, Cornell Univ., Ithaca, NY
ERC Report No. 14
Corporate Source: EPA, Office of Research and Development.
Cooperative Agreement No. CR807856 01.
Ithaca, NY, Ecosystems Research Center, 1982. 161 pp
Application of Ecosystem science to the regulation and
management of toxic substances
Keywords: Ecosystem Science and Regulation; Ecosystems Characteristics
and Processes; Methods for Ecotoxicology; Mathematical Models

****On the Relevance of Microecosystems for Risk Assessment: Some Considerations for Environmental Toxicology**
Smies, Maarten
Shell Intl Petroleum Maatschappij Bv, Netherlands
Ecotoxicology & Env Safety, Aug 83, V7, N4, P355(11)

The relevance of microecosystem studies for environmental toxicology is evaluated, with emphasis on environmental toxicity testing and risk assessment concerning chemical pollution. Microecosystems are any multispecies system with at least two trophic levels and its abiotic surroundings enclosed by artificial boundaries for research purposes. A standardized microecosystem design will probably not contribute to environmental hazard rating if it replaces currently used test schedules. (Numerous references, 1 table) (ENVL)

****On the Use of Indices in Aquatic Toxicological Hazard Assessment**
McErlean, Andrew J.; Duke, Thomas W.
Environmental Research Lab., Gulf Breeze, FL
Report No.: EPA-600/J-82-058; CONTRIB-432
Nov 81 13p
Pub. in Regulatory Toxicology and Pharmacology 1, p344-354 1981
Type Document: Journal article
PB82-239013

Application of environmental indexing techniques to aquatic toxicological hazard assessment is illustrated using three common data types (factors): acute invertebrate and vertebrate LC50 data and octanol-water partition coefficients for 37 chemical compounds. Subindex factor rating scales are constructed, total index computation is illustrated, and possible uses of this or other similar indices are discussed. (NTIS)

****A Perspective on Quantitative Structure-Activity Relationships in Ecotoxicology.** (Editorial)
Lipnick, Robert L.
EPA Office of Toxic Substances
Environmental Toxicology and Chemistry 1985, Vol. 4, p.255-257
EPA Libraries: EJE OTS; EKC GBreeze; ELB Cinn; EMB Ada; ESB Corv

****Principles of Ecotoxicology**
Butler, GC
Scientific Committee on Problems of the Environment
New York, Wiley & Sons, 1978. 350 pp
Type document: Series: SCOPE Report No. 12
EPA Libraries: EJE OTS; EKB RTP; EKC GBreese; EKD Athens;
ELB Cinn; ENA R7; ERB Las Vegas; ESB Corv.
Call Number: QH545.A1P74

****Prioritization of Chemicals According to the Degree of Hazard in the Aquatic Environment**
Branson, Dean R.
Dow Chemical Co, MI
Env Health Perspectives, Feb 80, V34, P133(6)

Survey Report: A promising scientific approach for classifying priority pollutants in the aquatic environment is presented. Under the hazard assessment approach, chemicals with the proven least margin of safety are awarded the highest priority. The least margin of safety is defined by the gap between the no-observable-effect concentration and the ambient exposure concentration. A hazard assessment of PCB's, DI-2-ethylhexyl phthalate, linear alkybenzene sulfonate, and pentachlorophenol is included. (3 graphs, 15 references, 3 tables) (ENVL)

****Research Needs in Developing Structure Activity Relationships**
Lipnick, Robert L.
EPA Office of Toxic Substances
In: Aquatic Toxicology and Hazard Assessment: Eighth Symposium. ASTM STP 891, p78-82
Philadelphia, American Society for Testing and Materials, 1986
EPA Libraries: EJB HQ

****Research Plan for Ecological Risk Assessment** [Draft]
Office of Research and Development
Office of Environmental Processes and Effects Research
June 27, 1986
CERI-86-21A
Appendix. Related Work (FY86) [Draft]
[Office of Research and Development]
June 27, 1986
CERI-86-21b

****Risk Assessment by Analysis of Extrapolation Error: Demonstration for Effects of Pollutants on Fish**
Suter GW II; Vaughan DS; Gardner RH
Oak Ridge National Laboratory, Oak Ridge, TN
Environmental Toxicology and Chemistry. 1983 v.2:369-378

This article describes a new method for risk assessment and applies it to assessing the risk of chronic toxicity of mercury to largemouth bass. The method consists of extrapolation between taxa and between toxicity test types by regression analysis. The variance terms in the regression analyses are combined with the point estimate of the geometric mean of the maximum allowable toxic concentration (GMATC) to derive a probability distribution of the GMATC. This distribution is then compared to the ambient contaminant concentration to derive the probability or risk of chronic toxicity. This general approach to risk analysis is applicable to any organism or toxicant.

Testing for Effects of Chemicals on Ecosytems: Working Papers Prepared as Background
(Final rept)
National Research Council, Washington, DC, 1981 260p
See also PB82-127200
PB83-132811

The eleven working papers in this volume were prepared for the study of the Committee to Review Methods for Ecotoxicology. The charge to the Committee was to identify characteristics of ecological systems that would indicate hazardous effects of chemicals beyond the level of single species, to establish criteria for suitable testing schemes, and to evaluate the effectiveness of available test systems in assessing effects of chemicals within ecosystems. To assist in its deliberations on the broad range of issues to be addressed, the Committee sought additional input from a number of experts. The working papers address a variety of topics: the use of microcosms as a testing scheme in terrestrial and aquatic systems; lethal gene distribution and diatoms as monitoring techniques for hazard assessment in wetlands and watersheds; approaches to assessing the environmental impact of radionuclide and xenobiotic organic substances; a general review of ecosystem properties relevant to ecotoxicology; and a discussion of the advantages and disadvantages of various of ecological tests. (NTIS)

User's Manual for Ecological Risk Assessment
Barnthouse LW; Suter GW II (Eds.)
Oak Ridge National Laboratory, Oak Ridge, TN
Prepared for the EPA, Office of Research and Development
EPA contact: Mogkissi, AA; Kutz F
Environmental Sciences Division
Publication No. 2679, March 1986. 215 pp.

This report presents the results of a four-year project on environmental risk analysis of synfuels technologies, funded by the Office of Research and Development (ORD), U.S. Environmental Protection Agency. The overall objective of the project was to support the ORD's synfuels research program by developing a risk assessment methodology capable of (1) ranking the waste streams in a process by risk to the environment, (2) estimating the change in environmental risk that would be achieved using alternative control technology options, (3) estimating the sensitivity of risk estimates to site-dependent variables, and (4) identifying research problems contributing the greatest uncertainty to risk estimates.

****Wildlife Toxicology**
Kendall, Ronald J.
Western Washington Univ., Bellingham, WA
Environmental Science and Technology. 1982. v.16(8): 448A-453A

"Integrated field and laboratory studies using selected model species might lead to ways of quantifying adverse effects of chemical contaminants."

CORPORATE RISK ASSESSMENT

****Comments of the Chemical Manufacturers Association on EPA's Proposed Guidelines for Carcinogenic Risk Assessment**
Submitted to EPA by the Chemical Manufacturers Association on January 24, 1985 +

****Comments of the Chemical Manufacturers Association on EPA's Proposed Guidelines for Exposure Assessments**
Submitted to EPA by the Chemical Manufacturers Association on January 22, 1985 +

****Comments of the Chemical Manufacturrs Association on EPA's Proposed Guidelines for the Health Assessment of Suspect Developmental Toxicants**
Submitted to EPA by the Chemical Manufacturers Association on January 25, 1985 +

****Comments of the Chemical Manufacturers Association on the EPA's Proposed Guidelines for the Health Risk Analysis of Chemical Mixtures**
Submitted to EPA by the Chemical Manufacturers Association on March 11, 1985 +

****Comments of the Chemical Manufacturers Association on EPA's Proposed Guidelines for Mutagenicity Risk Assessment**
Submitted to EPA by the Chemical Manufacturers Association on January 23, 1985 +

Risk Analysis in the Chemical Industry
Chemical Manufacturers Association
Rockville, MD: Government Institutes, Inc., 1985 pp.269

+ Other submissions from industry on the Risk Assessment Guidelines are filed at the Public Information Reference Unit (202)382-5926 EPA Library, 401 M Street, S.W., Washington, D.C. 20460

POLICY

****Determining Risks to Health: Federal Policy and Practice**
Corporate Source: U.S. Dept. of Health and Human Services.
Task Force on Health Risk Assessment
Dover, MA, Auburn House, c. 1986
xxii, 410p, Illustraded. Includes Index, Bibliography
p. 325-331
Type Document: Book
Keywords: U.S. Government Agencies; Health Policy; Probability;
Research; Risk
ISBN:0-86569-138-X
ISBN:0-86569-139-8
EPA Libraries: EJB HQ

****Risk and the Government Process**
Munro, I.C.; Morrison, A.B.; Bradshaw L.
Health & Welfare Canada, Ottawa Royal Society of
Canada/Et Al Risk Assessment & Perception Sym, Toronto,
Oct 18-19, 82, P183(8)

Conference Paper: Responsible regulatory decisions by governments regarding environmental hazards require careful evaluation of potential risks to humans. Animal studies serve as a qualitative surrogate for human experience, but the quantification of human risk on the basis of such data is questionable. In addition to risk assessment, many other health, economic, and social factors must be considered by governments in regulating environmental hazards. These include consumer expectations, impact on trade, availability of less hazardous substitutes, feasibility and cost of consumer education programs, and ability to enforce laws. (10 references) (ENVL)

****Risk Assessment and Regulatory Policy**
Wilkinson CF
Cornell Univ., Institute for Comparative and Environmental Toxicology
Comments on Toxicology. 1986, Vol. 1(1):1-21
(REFS 21)

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****Risk Assessment in the Federal Government: Managing the Process**
Corporate Source: National Research Council (U.S.) Committee on the Institutional Means for Assessment of Risks to Public Health
Washington, DC, National Academy Press, 1983
Type Document: Book
Keywords: Cancer Prevention; Decision Making; Health Planning; Environmentally Induced Diseases
EPA Libraries: EKA R4.RC276.N38 1983; EJA R3 RC276.N38 1983; EHA R1; EIA R2; EIC Edison; EJB HQ; EJE OTS; EKB RTP; EKD Athens; ELA R5; ELB Cinn; ELC Ann Arbor; EMA R6; EOA R8; EDB NEIC; ERA R9; ESA R10; ESB Corvallis
Call Number: RA445.R57

****Risk Assessment in the Policy-Making Process:**
Environmental health and safety protection (focuses on the United States Environmental Protection Agency and Food and Drug Administration; based on conference paper)
Regens, James L., et al.
Public Admin R 43:137-45 Mr/Ap '83
(PAIS)

****The Use of Risk Analysis in Federal Regulatory Agencies: An Exploration**
Kraft, Michael E.
Univ of Wisconsin
Policy Studies Review, May 82, V1, N4, P666(10)
Technical Feature: The role that risk analysis can play in Federal decision-making is examined. Ways in which risk analysis can be used by Federal Regulatory Agencies is described. Its future role as a tool in health, safety, and environmental regulation is analyzed. (16 references) (ENVL)

****Use of Risk Assessment in EPA Regional Operations**
Atlanta, GA, EPA Region 4, 1985
Keywords: EPA; Health Risk Assessment
EPA Libraries: EJB HQ
Report No.: EPA 904/5-85-140
Call Number: EPAX8603-0022

LEGAL ASPECTS

****Legal Considerations in Risk Assessment Under Federal Regulatory Statutes**
Hutt, Peter Barton
In: Assessment and Management of Chemical Risks,
Chapter 6. Washington, DC, American Chemical Society 1984
Throughout history, regulatory statutes to protect the public health and safety have been worded in sufficiently broad and general terms to authorize the government to utilize current scientific knowledge in determining adequate public protection. The statutory requirements of current health and safety laws implemented by FDA, EPA, CPSC and OSHA are sufficiently flexible to allow the adoption of whatever analytical and decision-making methodology best represents the public interest. Implementation of current regulatory statutes in this field is therefore constrained largely by the current state of scientific knowledge rather than by rigid or obsolete statutory requirements.
EPA Libraries: EJB HQ

****Risk and Benefit in Environmental Law**
Ricci, Paolo F; Molton, Lawrence S
(EPRI) and Science, Dec 4, 81, V214, N4525, P1096(5)
Technical feature: The treatment in law of several key issues in risk assessment is discussed: The meaning of the 1980 ruling that OSHA must demonstrate that a standard is needed to remedy a significant risk, the burden of proof under consitions of scientific uncertainty, and the resolution of the conflict between the need to reduce hazardous exposures and the desire for accuracy. There exist under current regulatory statutes several paradigms for balancing costs and benefits. (35 REFS) (ENVL)

****The Role of Courts in Risk Assessment**
Jenkins, Bruce S
Environmental Law Reporter 16:Aug 86, 10187-95

USES OF RISK ASSESSMENT

****EPA's Risk Assessment Process and Its Use in Making Risk Management Decisions**
Patrick, DR
U.S. Environ. Prot. Agency, Research Triangle Park
Pro. - APCA Annu. Meet.; Vol 78th, ISS Vol. 3, 1985,
85-33.3, 8 pp.
CBAC Copyright: Chem Abs. Review; cancer risk assessment pollution; Air pollution Cancer risk from, assessment of; Carcinogens In air and water, risk from, assessment of; Public health Carcinogen exposure in air and water in relation to; Water pollution Cancer risk from, assessment of. (NLM)

****Introduction to Risk Analysis** [2nd edition]
Megill, RE
Tulsa, OK, PenWell Pub. Co.
Keywords: Risk; Mathematical Models; Petroleum Industry and Trade; Gas Industry
EPA Libraries: EKB RTP; ELA R5
Call Number: HB615.M43 1984

****Pesticide Hazard Assessment**
Wayland, Robert H.
EPA Office of Toxic Substances, Wash DC
Presented at Intl Joint Comm Hazard Assessment Sym,
Ann Arbor, Apr 9-11, 79, P85(7)
Technical Feature: One of the most controversial and difficult EPA tasks is pesticide regulation. Provisions of the Federal Insecticide, Fungicide, and Rodenticide Act of 1972 and other legislation affecting such regulation are examined. Validated hazard informtion is combined with exposure potential to produce the EPA position on the potential risk posed by pesticide use. (ENVL)

****Risk Assessment of Complex Mixtures**
Gibb, H.J.; Chen, C.W.
Environmental Protection Agency, Washington, DC.
Office of Health and Environmental Assessment
Report No.: EPA-600/D-84-186
Jul 84 23p
PB84-223478
Quantitative carcinogenic assessment of complex mixtures is complicated by the variability of the mixtures. Different samples of effluents from the same source may vary in their carcinogenic potency. A multiplicative effect could be produced by the action of different fractions of a mixture on different stages of the carcinogenic process. A mathematical formula explaining this multiplicative effect is presented here. Antagonism may result from the action of different fractions on the same stage. Actual data from both epidemiologic studies and animal investigations are used for illustration. (NTIS)

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Risk Assessments for Energy Systems and Role of Preliminary Degree-of-Hazard Evaluations
Habegger, L.J.; Fingleton, D.J.
Argonne National Lab., IL
Sponsor: Department of Energy, Washington, DC
Report No.: CONF-8511148-2
Nov 85 16p
Task force meeting on risk and policy analysis under conditions of uncertainty, Laxenburg, Austria, 25 Nov 1985
Type Document: Conference Proceeding
Contract No.: W-31-109-ENG-38
DE86005564/XAB

The appropriate approach to risk or hazard assessment can vary considerably, depending on various factors, including the intended application of the results and the time other resources available to conduct the assessment. This paper illustrates three types of interrelated assessments. Although they can be mutually supportive, they have fundamentally different objectives, which require major differences in approach. The example of the overall risk assessment of alternative major energy technologies illustrates the compilation of a wide range of available risk data applicable to these systems. However, major uncertainties exist in the assessments, and public perception of their importance could play an important role in final system evaluations. A more narrowly defined risk assessment, often focusing on an individual component of a larger system, is the most commonly used approach in regulatory applications. The narrow scope allows in-depth analysis of risks and associated uncertainties, but it may also contribute to a loss of perspective on the magnitude of the assessed risk relative to that of the unassessed risks. In some applications, it is useful to conduct semiquantitative degree-of-hazard evaluations as a means of setting priorities for detailed risk assessment. The MAHAS procedure described in this paper provides a means of rapidly ranking relative using easily accessible data. However, these rankings should not be used as definitive input for selecting technology alternatives or developing regulations. (25 references, 6 tables)
ERA citation 11:020040) (NTIS)

****Risk Assessments/Risk Management for Environmental Uses of Biological Agents**
Anderson EL; Albert RE; Kamely D.
Environmental Protection Agency, Washington, DC.
Office of Health and Environmental Assessment
Sponsor: New York Univ. Medical Center, NY
Report No.: EPA/600/D-85/285
C1985 13p
Prepared in cooperation with New York Univ. Medical Center, NY
Pub. in Banbury Report 22; Genetically Altered Viruses and the Environment, p27-38 1985
PB86-131810

Through recent advances in molecular biology, especially biotechnology, regulatory agencies are faced with evaluating a range of biological agents for potential risks they pose to human health and the environment. Although biological risks are of relatively recent concern, this has not been the case for chemicals. Over the past several years, the Environmental Protection Agency (EPA) has developed methodologies for assessing health risks associated with chemical pollutants, especially chemical carcinogens. In anticipation of regulating biological agents, including genetically engineered microorganisms, the Agency must stimulate the generation of a solid scientific basis in order to adapt its present, chemically based risk assessment approaches to biological agents. Assessing biological Uses of Risk Management risk poses unique problems owing to the diversity (hormones, enzymes, bacteria, fungi, viruses, plasmids) and the ability of live molecules to replicate, transform, transduce, and infect. (NTIS)

****Risks Associated with Nuclear Power: A Critical Review of the Literature, Summary and Synthesis Chapter**
National Academy of Sciences, Committee on Science and Public Policy
Washington, DC, National Academy of Sciences, 1979
Keywords: Nuclear Reactors; Safety Measures; Radiation Effects;
Radioactive Wastes
EPA Libraries: ERA R9
Call Number: TK9152.R5822

****Risks of Nuclear Power Reactors: A Review of the NRC Reactor Safety Study**
Kendall, Henry Way; Hubbard, Richard B.; Minor, Gregory C.
Cambridge, MA, Union of Concerned Scientists, 1977
Type Document: Report
Keywords: Nuclear Regulatory Commission; Reactor Safety Study;
Safety Measures; Accidents
EPA Libraries: ERB Las Vegas
Call Number: WASH-1400

****Selected Approaches to Risk Assessment for Multiple Chemical Exposures**
Stara JF; Erdreich LS
Environmental Protection Agency, Cincinnati, OH
Environmental Criteria and Assessment Office
Type Document: Conference Proceeding
Report No.: EPA/600/9-84/014B
Jun 84 162p
See also PB84-226992
PB84-227008
This appendix to Selected Approaches to Risk Assessment for Multiple Chemical Mixtures: Progress Report on Guideline Development at ECAO-Cin' contains post-meeting comments on the issues sent by the peer reviewers of the workshop, plus selected references pertaining to the guidelines. All pertinent comments have been addressed in the primary report. (NTIS)

****Selected Approaches to Risk Assessment for Multiple Chemical Exposures: Progress Report on Guideline Development at ECAO**
(Environmental Criteria and Assessment Office)-Cincinnati
Stara JF; Erdreich LS
Environmental Protection Agency, Cincinnati, OH
Environmental Criteria and Assessment Office
Report No.: EPA/600/9-84/014A
Jun 84 117p
See also PB84-227008
Type Document: Conference Proceeding
PB84-226992

This report summarizes the second of a series of workshop meetings on methods for assessing human health risks from exposure to chemical mixtures sponsored by the Environmental Criteria and Assessment Office (ECAO) of the U.S. Environmental Protection Agency, July 12-13, 1983. The first workshop 'Approaches to Risk Assessment for Multiple Chemical Exposures' held in September 1982 provided a basis for selecting methods to develop into risk assessment guidelines. Five issues were reviewed at this meeting: (1) inter-species conversion of dose and duration of exposure, (2) assessment of risk for less than lifetime exposure to carcinogens and to other toxicants, (3) additivity model for chemical mixtures, (4) methods for determination of acceptable daily intakes from quantal of continuous data, and (5) pharmacokinetic basis of route-to-route conversions. Working groups also produced recommendations for approaches to four additional problems: consideration of high risk subgroups, assessment of multiple routes of exposure, ranking the severity of effects and the use of exposure and monitoring data in health risk assessment. A symposium on this methodology is planned for the fall of 1984. (NTIS)

****The Use of Environmental Risk Analysis for Ranking Hazardous Substances Released to Soil or Groundwater**
McKone, Thomas E.
NRC
IES ENV Technology 29th Technical Sym, Los Angeles,
Apr 19-21, 83, P380(5)

Conference paper: An approach for indexing the long-term health risks of toxic chemicals and radionuclides using crustal chemical cycles is detailed. The external environment is depicted in a pathways model, which uses a landscape prism as a tool for mapping toxic material cycles on and near the crustal surface. Average concentrations in air, water, and food are derived and translated into a collective population dose field expressed as daily intake. The models are used to index the health risk added to a hypothetical landscape from additions of arsenic, lead, uranium 238, and radium 226 to groundwater and soil. (2 diagrams, 13 references, 3 tables) (ENVL)

Uses of Risk Assessment
Moore, John
US EPA Office of Pesticides and Toxic Substances
Washington, DC, EPA, 1985
Type Document: Conference Proceedings
Notes: Risk Assessment Conference, March 18, 1985
EPA Libraries: EJB HQ
Call Number: EPAX 8510-0007

BIBLIOGRAPHIES AND OTHER SOURCES *....this section highlights a variety of documents, including bibliographies, serial publications, directories, special subject collections, indexes, etc. These sources lead to informtion and data on specific chemicals and chemical groups as well as on many of the intricate components of risk assessment including exposure, fate, toxicity, chemical safety and handling, physical and chemical properties, standards and regulations, manufacturing and use, etc.*

****Air Toxics Information Clearinghouse: Bibliography of Health Effects and Risk Assessment Information**
(Interim rept.)
Pelland AS; Post BK; Mead RC
Radian Corp., Research Triangle Park, NC
Sponsor: Environmental Protection Agency,
Research Triangle Park, NC.
Office of Air Quality Planning and Standards
Report No.: RAD-84-240-016-52-05
23 Jul 84 74p
Type Document: Bibliography
Contract No.: EPA-68-02-3513
PB86-181161/XAB

The document provides state and local air agencies and other Clearinghouse users with citations to selected publications pertaining to health effects and risk assessment of toxic pollutants. These documents were published by the following four agencies: National Academy of Sciences, The World Health Organization, the National Cancer Institute of Occupational Safety and Health of the Centers for Disease Control. In selecting references for inclusion in the bibliography, emphasis was placed on documents published since 1974 which reported health effects of toxic or potentially toxic pollutants that can be emitted into the air and assessments of risks of these pollutants. Most documents focus on one or more toxic or potentially toxic chemicals, and a few focus on exposure to toxic substances in a particular industry. While ambient air exposure was the focus, references on occupational exposure and exposure via drinking water were also included. Summaries and compilations emphasizing analyses of information on pollutants rather than results of individual toxicity or health effects tests were included to keep the bibliography a manageable size. (NTIS)

****EPA Publications Bibliography.** Quarterly Abstract Bulletin
EPA, Office of Administration and Resource Management, Washington, DC

This quarterly publication has two cumulative volumes: EPA Cumulative Bibliography, 1970-1976 and the EPA Cumulative Bibliography, 1977-1983

The subject section is useful for locating the Agency's risk assessments on specific chemicals or environmental hazards. The reader also has access to the assessment literature by author, title, and contract number.

Available in all EPA Libraries

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****Hazardous Waste Collection and Hazardous Waste Database**
Environmental Protection Agency
A specialized collection of journals, articles, commercial databases, books, EPA reports, other related technical reports, and Office of Solid Waste and Emergency Response Policy and Guidance directives. Each EPA Library has the index to the Collection in hard copy, and PC format. Updates are added quarterly. For further information contact the HQ Library at 8-382-5922.

****Information Resources in Toxicology**
Wexler, Phillip
New York, Elsevier, 1982, 333 pp
This is a comprehensive guide with annotated references that surveys the literature as well as national and intrnational organizations, and educational programs.
EPA Libraries: EJE OTS
Call Number: RA1193.4.W49

****The Office of Toxic Substances Information Architecture Notebook**
EPA, Office of Toxic Substances, Springfield, VA
National Technical Information Service, Aug 1983
PB 84-188655
Chapters V and VII direct the reader to a variety of standard references for obtaining information on chemical identification, health and ecological effects, exposure assessment; chemical production, use, and volumes; regulation and standards.
EPA Libraries: EJB HQ; EJE OTS

****ORD Topical Directory**
USEPA, Office of Research and Development
Washington, DC, EPA, February 1986
Type Document: Directory
An alphabetical listing of areas in which the Office of Research and Development (ORD) has technical expertise, individuals who are active in these areas, with a telephone number and office/laboratory location.
EPA Libraries: EJB HQ
EPA Report Number: EPA 600/9-86-006

Risk Assessment Bibliography [Draft]
Malin, Wayne
(Draft) EPA Region 1 Library, JFK Federal Building, Boston, MA

****Risk Assessment Review**
Cincinnati, OH, EPA CERI Distribution, EPA, Office of Research
and Development and Region IV Atlanta
Document Type: Serial
Frequency: Bimonthly
An in-house EPA publication intended to serve as a forum for
information exchange on risk assessment activities and developments.
Distributed by: EPA-Center for Environmental Research
Information/ORD. 26 West St. Clair St., Cincinnati, OH 45268
(513) 684-7391 (513) 569-7391

****Superfund Risk Assessment Information Directory**
U.S. Environmental Protection Agency.
Office of Information Resources Management and
Office of Toxic Substances, Washington, D.C. 20460
Office of Solid Waste and Emergency Response
EPA 540/1-86/61 OSWER Directive 9285.6-1)
Contract No. 68-01-7090. November 1986
The Directory has been developed for use by a diverse audience, including EPA regional staff, state Superfund program staff, federal and state remedial contractors, and potentially responsible parties. Sufficient background information on the risk assessment process and its general information requirements is provided so that the directory can be easily used by individuals with varying degrees of risk assessment experience.

****Risk Assessment Forum Series**
U.S. Environmental Protection Agency
This series prexents scientific and technical evaluation and review of issues arising from the EPA Risk Assessment process.
Note: The first publication in this series is:
Proliferative Hepatocellular Lesions of the Rat: Review and Future
Use in Risk Assessment
EPA 625/3-86/011. Feb 86
Contact: Dorothy E. Patton, 202/382-7315

ENVIRONMENTAL PROTECTION AGENCY

INFORMATION SYSTEMS INVENTORY (ISI)

The EPA ISI is an exhaustive catalog of the Agency's computerized information systems. The ISI was compiled to help coordinate information gathering activities, facilitate cross-media data sharing across programs, and eliminate duplicate data collections and systems development. Many of the 500 files/systems in the Inventory support risk assessments. Only a sampling of descriptions of these systems follows. They represent some of the risk assessment information/sources EPA has developed on pesticides, radiation exposure, toxicity of chemicals for estimating health and ecological risks, and surface water monitoring.

The complete EPA Information Systems Inventory is available from the National Technical Information Service (NTIS), ordering number PB87-131017. It is also available in hardcopy and microfiche, PB87-131009.

The ISI is also available on diskette for use on an IBM PC. The EPA HQ Library and Regional Libraries can search the database for EPA staff.
Contact: HQ Library 8-382-5922 or your EPA Library (Appendix B)

Examples of information systems in the ISI which contain risk information are described in the following pages.

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DATABASE NAME: **National Pesticide Hazard Assessment Program**

CONTACT: Frank Davido

PHONE: (703) 557-0576, FTS 8-557-0576

ABSTRACT:

The former National Pesticide Hazard Assessment Program conducted surveys and studies designed to obtain information on human exposure to pesticides, environmental monitoring and health effects information.

SUBJECT COVERAGE (KEYWORDS):

Pesticide Exposure
Health and Environmental Effects
Monitoring

PRODUCER:

Office of Pesticide Programs

FILE COMPONENTS:

Study reports

UPDATE FREQUENCY:

Annually

NUMBER OF RECORDS IN FILE:

50 reports have been prepared. A list of Titles are available from the contact

(ISI)

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DATABASE NAME: **Pesticide Document Management System - PDMS**

CONTACT: John Carley

PHONE: (703) 557-3240, FTS 8-557-3240

ABSTRACT:

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires every pesticide manufacturer or producer to submit scientific data to EPA before a pesticide product can be manufactured in the United States. These data are maintained in the Pesticide Document Management System. Related information from the published literature is also included.

SUBJECT COVERAGE (KEYWORDS):

Pesticide Effects on Health and the Environment
Chemical Use

PRODUCER:

Office of Pesticide Programs

SOURCES:

Submission of data by chemical industry prior to manufacturing pesticide products in the United States under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

UPDATE FREQUENCY:

Daily

(ISI)

DATABASE NAME: **Pesticide Poisoning Reports and Statistics**

CONTACT: Jerome Blondell

PHONE: (703) 557-0321, FTS 8-557-0321

ABSTRACT:

Reports and statistics related to human pesticide accidents are accumulated from a variety of sources. The principal data available include mortality statistics, hospitalized poisoning estimates, emergency room estimates, physician-treated occupational cases from California, and case reports summarized by specific pesticide.

SUBJECT COVERAGE (KEYWORDS):

Human Population
Health Effects

PRODUCER:

Office of Pesticide Programs

SOURCES:

U.S. Consumer Product Safety Commission - National Electronic Injury Surveillance System (surveys sample of emergency rooms)
California Dept. of Food and Agriculture
Poison Control Center Database

UPDATE FREQUENCY:

Annually

(ISI)

DATABASE NAME: **Pesticide Product Information System - PPIS**

CONTACT: John Carley

PHONE: (703) 557-3240, FTS 8-557-3240

ABSTRACT:

The Pesticide Product Information System contains information concerning all pesticide products registered in the United States. It includes registrant name and address, chemical ingredients, toxicity category, brand name, etc.

SUBJECT COVERAGE (KEYWORDS):

Registered Pesticides
Ingredient
Product Labels
Use
Registrant
Brand Name
Pest
Site
Toxicity

PRODUCER:

Office of Pesticide Programs

SOURCES:

Pesticide Registration Requirements

UPDATE FREQUENCY:

Daily

(ISI)

EPA INFORMATION SYSTEMS INVENTORY

DATABASE NAME: **Atmospheric Dispersion of Radionuclides**

CONTACT: Christopher Nelson

PHONE: 703-557-9380, FTS 8-557-9380

ABSTRACT:

AIRDOS-EPA is a model for estimating annual intakes and exposures from the atmospheric release of radionuclides. The purpose of the program is to provide these quantities as input to a companion program (DARTAB) to assess the individual or collective doses and risks associated with chronic releases of radionuclides. Atmospheric dispersion, wet and dry deposition, and food pathway models are included. Provision is made for radionuclide chain ingrowth and decay as well as environmental removal in the terrestrial portion of the model.

SUBJECT COVERAGE (KEYWORDS):

Model
Non-Point Source
Radiation Exposure
Health Effects
Airborne Radionuclides

PRODUCER:

Office of Radiation Programs

(ISI)

NAME: Cohort Analysis of Increased Risks of Deaths Model--CAIRD

CONTACT: Neal S. Nelson

PHONE: (202) 475-9640, FTS 8-475-9640

ABSTRACT:

The CAIRD Model (Cohort Analysis of Increased Risks of Deaths) is used in risk analysis. Incremental health effects produced in a cohort exposure to radiation are calculated by using a life table method for either an absolute or a relative risk projection model. If desired, incremental health effects can be calculated for any risk for which a rate, preferably an annual rate, of occurrence is available. Risks can also be stripped from the cohort to estimate what removal of a specific risk would do for life expectancy.

SUBJECT COVERAGE (KEYWORDS):
Model
Human Population
Health Effects
Risk Assessment

PRODUCER:
Office of Radiation Programs

FILE COMPONENTS:
FORTRAN - IV source program

SOURCES:
Unabridged life tables and age-specific mortality rates from any source can be used in the program. Currently 1970 and 1980 US data from the National Center for Health Statistics are employed.

UPDATE FREQUENCY:
As necessary - Last update August 1986

NUMBER OF RECORDS IN FILE:
Approximately 1,000

(ISI)

DATABASE NAME: **Dose and Risk Assessment Tabulation - DARTAB**

CONTACT: Christopher Nelson

PHONE: 703-557-7380, FTS 8-557-7380

ABSTRACT:

Program is used to compute fatal cancers and genetic defects from radiological concentrations on the ground surface, air, and in water and vegetation. It is used in conjunction with RADRISK information to provide risk assessment information for AIRDOSE-EPA, and PRESTO-EPA.

SUBJECT COVERAGE (KEYWORDS):

Cancer
Radiation Genetics
Human Population
Dose
Radiation Exposure

PRODUCER:

Office of Radiation Programs

(ISI)

EPA INFORMATION SYSTEMS INVENTORY

DATABASE NAME: **A Low-Level Radioactive Waste Transport and Risk Assessment Code - PRESTO-EPA**

CONTACT:

PHONE: 703-557-8610, FTS 8-557-8610

ABSTRACT:

PRESTO-EPA is computerized model which calculates the health effects to an exposed population from the radioactivity which escapes from a shallow land burial site or through options from a deep geologic burial site. DARTAB is used as a subroutine to calculate fatal cancers and genetic defects. RADRISK data is required to run the model.

SUBJECT COVERAGE (KEYWORDS):

Model, Human Population, Health Effects
Ground Water
Surface Water
Drinking Water
Site Characteristics
Treatment/Disposal
Radioactive Waste, Land Burial

PRODUCER:

Office of Radiation Programs

(ISI)

DATABASE NAME: **Maximum Individual Dose Model - MAXDOSE**

CONTACT: Daniel Egan

PHONE: 703-557-8610, FTS 8-557-8610

ABSTRACT:

The MAXDOSE code calculates accidental releases from a nuclear waste repository. Both geological and human events are modelled. Each event produces a given set of dose rates at different times and distances. A second set of tables estimate contaminated areas and individual risk. Both leaching and dissolution remove waste from the matrix into the accessible environment. The releases are used to calculate the dose table.

SUBJECT COVERAGE (KEYWORDS):

Environmental Releases
Model
Nuclear Waste
Radiation

PRODUCER:

Office of Radiation Programs

(ISI)

DATABASE NAME: **Radionuclide Dose Rate/Risk**

CONTACT: . Christopher B. Nelson

PHONE: 703-557-9380, FTS 8-557-9380

ABSTRACT:

RADRISK is a model designed to estimate the health risk due to inhalation or ingestion of radionuclides for arbitrary periods. The end result of the system is a set of values relating fatal cancers and genetically significant radiation doses to a unit intake of radionuclides. The model is a greatly revised combination of two previously existing programs--INREM II and CAIRD. The health risk from external exposures is also estimated by the CAIRD model using does rates from a separate model--DOSFACTER.

SUBJECT COVERAGE (KEYWORDS):

Model
Health Effects
Radiation Health Risks

PRODUCER:

Office of Radiation Programs

UPDATE FREQUENCY:

Semiannually

(ISI)

EPA INFORMATION SYSTEMS INVENTORY

DATABASE NAME: **WESPDOSE 2/REPRISK**
High Level Radioactive Waste Risk Model Environmental Pathways Analyses

CONTACT: Michael Smith

PHONE: (205) 272-3402, FTS 8-534-7615

ABSTRACT:
This computer code is used in Office of Radiation Programs in ORP's high level radioactive waste analyses to calculate somatic and genetic risk information for use by the ORP REPRISK computer code. WESPDOSE 2 and REPRISK are used together to calculate somatic and genetic health effects per Curie release of user specified radionuclides to the available environment for four release modes, which are: releases to a river, releases to an ocean, releases to land surfaces and releases to air. These codes trace the environmental transport of radionuclides released via each of these release modes through the applicable water, air and terrestrial environmental transport pathways to man, calculates the external exposure and intake of radionuclides, and determines the resulting somatic and genetic risk to the exposed population.

SUBJECT COVERAGE (KEYWORDS):
Human Population, Genetic Risk, Fatal Cancer Risk
Surface Water
Soil
Environmental Transport
Risk
Atmospheric Radiation, Exposure

PRODUCER:
Office of Radiation Programs

SOURCES: WESPDOSE 2.For and REPRISK.For

AVAILABLE AT: WESPDOES 2 - EPA/EERF, 1890 Federal Drive, Montgomery, AL 36109 FTS 534-7615
REPRISK - ORP, 401 M Street, SW,
Washington DC 20460

(ISI)

EPA INFORMATION SYSTEMS INVENTORY

DATABASE NAME: **Mixture and Systemic Toxicant Risk Model - MSRM**

CONTACT: Richard Hertzberg

PHONE: (513) 569-7582, FTS 8-684-7582

ABSTRACT:

This system contains statistical methods and extrapolation models for using available toxicological and epidemiological data in estimating human health risk from exposure by any route. Methods and graphics programs are also being developed for testing the risk models. Cancer risk models are included for completeness, but are developed elsewhere. Non-cancer risk assessment models and estimation procedures treat response rates and discrete response categories as endpoints for single chemicals and mixtures. The methods include those in the Agency Risk Assessment Guidelines for comparison.

SUBJECT COVERAGE (KEYWORDS):

Model, Health Risk Measures,
Body Burden
Human Population
Health Effects
Exposure
Nonhuman population
Statistics, Graphics, Physiological Parameters

PRODUCER:

Office of Research and Development

UPDATE FREQUENCY:

Quarterly

(ISI)

DATABASE NAME: **Studies on Toxicity Applicable to Risk Assessment--STARA**

CONTACT: Richard Hertzberg

PHONE: (513) 569-7582, FTS 8-684-7582

ABSTRACT:

This system contains all available quantitative toxicological data on environmental chemicals. Studies are screened for appropriateness for human health risk estimation. Data files include one record per dose group in the original reported units of measure. Related WYLBUR EXEC procedures allow generation of formatted tables of the original data, tables of data in human equivalent (dose-duration) terms, and graphs of severity vs. dose and duration in original or human equivalent units. The data files currently cover all Agency priority pollutants (water quality and air lists).

SUBJECT COVERAGE (KEYWORDS):

- Model
- Dose-Response
- Human Population
- Health Effects
- Nonhuman Population
- Graphics
- Physiological Parameters

PRODUCER:

Office of Research and Development

UPDATE FREQUENCY:

Annually

(ISI)

DATABASE NAME: **Probabilistic Dilution Model - PDM**

CONTACT: Karen Hammerstrom TS-798

PHONE: (202) 382-3896, FTS 8-382-3896

ABSTRACT:

The Probabilistic Dilution Model, originally developed by the Office of Water, allows an estimation of the percent of time a given concentration level may be exceeded in receiving streams. These estimates are based on the statistical distribution of daily volume flows, which typically approximate a log normal distribution, and upon solution of a mass balance dilution equation. The Design and Development Branch and the Exposure Assessment Branch have put together a Basic program that uses the probabilistic dilution methodology. The program contains averages of mean and low flows of streams in the major river basins of the U.S., broken down by direct and indirect dischargers and SIC (Standard Industry Classification) codes.

SUBJECT COVERAGE (KEYWORDS):

Model
Monitoring
Surface Water
Receiving Streams

PRODUCER:

Office of Toxic Substances

UPDATE FREQUENCY:

Daily

(ISI)

DATABASE NAME: **TSCATS - Toxic Substances Control Act Test Submissions**

CONTACT: Doug Sellers

PHONE: 202-382-2320, FTS 8-382-2320

ABSTRACT:

TSCATS is the catalog of test submissions received by OTS under various provisions of TSCA. Each record includes the purpose of testing (observations sought), the test organism(s) used, the route of administration, submitting company, and performing laboratory and where available, a description of the nature of the pure, component of a mixture). The title of the submissions is given as well as file identification data. All data are from the public record.

SUBJECT COVERAGE (KEYWORDS):

Risk Assessment; Toxicity; Health Effects Testing,
Environmental Effects Testing

PRODUCER:
Office of Toxic Substances

FILE COMPONENTS:

Submissions under TSCA Section 8(d) health and safety studies; Section 8(e) notice of substantial risk, Section 4 Testing, FYI (for your information).

SOURCES: Unpublished health and safety studies and test results submitted to EPA by chemical manufacturers and processors under the Toxic Substances Control Act (TSCA)

UPDATE FREQUENCY: Quarterly

BEGINNING DATE: 1985

NUMBER OF RECORDS IN FILE: 4,000 citations covering 2,000 unique chemical substances

AVAILABLE: Tapes from National Technical Information Service
Chemical Information System

(ISI)

EPA INFORMATION SYSTEMS INVENTORY

DATABASE NAME: **IRIS**

Integrated Risk Information System

CONTACT: Steven Young

PHONE: (202) 382-5625, FTS 8-382-5625

ABSTRACT:

IRIS is an E-Mail based system containing EPA data on a chemical by chemical basis. Data include, when available, oral reference doses, carcinogencity assessments, acute health hazard data, and risk management summaries. Sources of data include ORD, OPTS, OW, OAR, OSWER, and OPPE.

SUBJECT COVERAGE (KEYWORDS):

Environmental Effects; Health Effects;
Physical-Chemical Properties; Chemical;
Population, Human; Chemical Use;
Risk Assessment; Risk Management

PRODUCER:

Office of Research and Development

(ISI)

RISK MANAGEMENT

.... DESCRIBES REGULATORY DECISION-MAKING PROCESSES TO CONTROL AND MANAGE RISK.

General Perspective	**135**
Policy	**153**
Legal Aspects	**161**
Health Risks	**165**
Economic Analysis	**169**
Corporate Risk Management	**171**
Bibliographies and Other Sources	**173**

RISK MANAGEMENT

GENERAL PERSPECTIVE .... *includes decision-making, acceptable risk, risk-taking (psychology), multi-media approach, cross-media (holistic) approach, applications, uncertainty, risk/benefit.*

****Acceptable Risk**
Fischhoff, Baruch
New York, Cambridge University Press, 1981
Type Document: Book
EPA Libraries: EHA R1; EKE RTP OAQPS; ERA R9; ELA R5 [1983]; ESA R10 [1983]
Call Number: HD61.A24

****Acceptable Risks**
Imperato, Paaxl James; Mitchell, Greg
New York, Viking, 1985
Type Document: Book
Keywords: Preventive Medicine, Safety Education, Health
EPA Libraries: EMA R6; ESA R10
Call Number: RA431.I46 1985

Air: A Significant Component of a Multi-Media Approach to the Management of Hazardous Materials
Ford, John P.
Williams & Jensen, Washington, DC
Conference Title: Proceedings of the Third Annual Hazardous Materials Management Conference. (Held as part of the Hazardous Materials Management Conference & Exhibition.) Philadelphia, PA, 1985 Jun 4-6
Source: Proceedings of the Annual Hazardous Materials Management Conference 3rd. Publ by Tower Conference Management Co., Wheaton, IL, p 5-10
E.I. Conference No.: 07549
Keywords: *Hazardous Materials--*Management; Air Pollution--Legislation; Risk Studies--Assessment; Chemicals--Toxicity; Air Toxics; Priority Pollutants More is known now about the nature and extent of air toxics than ever before. The General Accounting Office has studied it. EPA has studied it. State and territorial air pollution program administrators have studied it, as well as others. In spite of these efforts, inadequacies in the art of risk assessment and risk management assure that future legislative and administrative initiatives will be the products of imprecise and incomplete data. Air toxics are increasingly seen as but one component of a complex multimedia problem. Thus, Congress and administrative agencies are increasingly inclined to go across media (and therefore bureaucratic program) lines. Proposed changes to the Toxic Substances Control Act (TSCA), right to know proposals, CERCLA, and the recent amendments to RCRA are illustrated. (EI)

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Application of Risk Assessment and Risk Management
Ford, K
Ecol. and Environ., Denver, CO
National Environmental Health Association 49th Annual
Educational Conference, Las Vegas, NV, 23-27 June 1985
National Environmental Health Association, Denver, CO.
(CPI)

An Approach to Societal Risk Acceptance Criteria and Risk Management
Okrent, David; Whipple, Chris
California Univ., Los Angeles, School of Engineering and
Applied Science.
Sponsor: National Science Foundation, Washington, D.C.
Research Applied to National Needs.
Report No.: UCLA-ENG-7746; NSF/RA-770166
Jun 77 380p
See also PB-261 866.
Contract No.: NSF-DEP75-20318
PB-271 264/4

A quantitative approach to risk acceptance criteria and risk management is proposed for activities involving risk to individuals not receiving direct benefits, such as employment, from the activity. Societal activities are divided into major facilities or technologies, all or part of which are categorized as essential, beneficial, or peripheral, and a decreasing level of acceptable risk to the most exposed individual is proposed (say, 0.0002/year for essential, 0.00001/year for beneficial, and 0.000002/year for peripheral activity). The risk would be assessed at a high confidence level (say, 90%), thereby providing an incentive to the gaining of better knowledge. Each risk-producing facility, technology, etc., would have to undergo assessment both of risk to the individual and to society. The cost of the latter would have to be internalized, probably via a tax paid to the Federal Government, which in turn would redistribute the benefit as national health insurance or reduced taxes to the individual. Risk aversion to large events would be built into the internalization of the cost of risk. (NTIS)

Approaches to Acceptable Risk: A Critical Guide
Fischhoff, Baruch; Lichtenstein, Sarah; Slovic, Paul;
Keeney, Ralph; Derby, Stephen
Oak Ridge National Lab., TN
Sponsor: Nuclear Regulatory Commission, Washington, DC;
Department of Energy, Washington, DC
Report No.: ORNLSUB-7656/1
Dec 80 336p
Prepared in cooperation with Decision Research, Eugene, OR,
Woodward-Clyde Consultants, San Francisco, CA, and Stanford Univ., CA
Contract No.: W-7405-ENG-26
NUREG/CR-1614

Acceptable-risk decisions are an essential step in the management of technological hazards. The absence of an adequate decision-making methodology is neither good for hazard management nor good for society. This report offers a critical analysis of the viability of various approaches as guides to acceptable-risk decisions. It does so by (1) Defining acceptable-risk decisions and examining some frequently proposed, but inappropriate, solutions. (2) Characterizing the essential features of acceptable-risk problems that make their resolution so difficult. (3) Creating a taxonomy of decision-making methods, identified by how they attempt to address the features of acceptable-risk problems. (4) Specifying the objectives that an approach should satisfy in order to guide social policy. (5) Rating the success of the approaches in meeting these objectives. (NTIS)

****Chemical Safety: An Agenda for Continued Progress in the Control of Toxic Pollutants**

Illinois Env Protection Agency Report Env/84-001, Feb 84 (219)

State/Local Govt report a toxics control strategy for Illinois seeks to eliminate unreasonable risk of adverse effects on human health and the environment from exposure to toxic pollutants. The agenda includes biological toxicity assessments, Site-specific problem evaluations, risk management techniques, phased implementation, and integrated management. Guidelines are developed for controlling hazardous wastes on land and in water, as well as for pesticides and air pollution control. (ENVL)

Cognitive Behavior and Information Processing Under Conditions of Uncertainty

Jacobs, TO

Army Research Inst. for the Behavioral and Social Sciences,
Alexandria, VA, 15 Jul 83 5p

This article is from 'Management of Risk Uncertainty Workshop Held at Fort Belvoir, Virginia on 13-15 July 1983.' AD-A136 230 p165-169

AD-P002 310/1

Over the past decade, research and synthesis of findings on decision making have led to the unequivocal conclusion that earlier conceptualizations about the decision process were either overly simplistic or lacking in veridicality. The nature of the decision task and the conditions under which it is performed have a profound influence on the decision process. These effects include the decision maker's view of the process, and (probably) information processing strategies which the decision maker may be unaware of having chosen. Further, there is a growing body of literature which suggests that the nature of the decision process is strongly influenced by the organizational level at which the decision maker is located, i.e., what his critical functions in the organization are, and the nature of the cognitive skills he therefore must bring to the task. The purpose of the present paper is to present some of these data, together with some possible implications they have for decision making under conditions of uncertainty, and for risk management. (NTIS)

Comparative Evaluation of Quantitative Decision-Making Approaches
(Final rept.)
Merkhofer, MW
SRI International, Menlo Park, CA
Sponsor: National Science Foundation, Washington, DC
Report No.: NSF/PRA-83014
Apr 83 165p
See also PB83-214106
Contract No.: NSF-PRA80-07238; SRI-2102
PB83-214114

Research undertaken to support the selection of a quantitative decision-making approach to a risk management problem is described. Risk is defined, and the character of risks and the processes by which risks are generated are examined. The role of government in risk management is addressed and arguments in favor of government regulation are offered. A taxonomy is proposed for characterizing risk problems and examples are supplied for each of the characteristics. Alternative decision-making approaches are suggested for supporting government decisions involving risk. Criticisms directed at formal decision-making approaches are considered. Various decision-making approaches are evaluated. (NTIS)

Comparative Evaluation of Quantitative Decision-Making Approaches. Executive Summary
Merkhofer, MW
SRI International, Menlo Park, CA
Sponsor: National Science Foundation, Washington, DC
Report No.: NSF/PRA-83015 Apr 83 10p
See also PB83-214114
Contract No.: NSF-PRA80-07238; SRI-2102
PB83-214106

The nature of the social risk management problem is explored and possible solutions to the problem are offered. The question of whether or not the government should regulate in the face of increasing public concern over technological risks is addressed. It is determined that government could act to modify the hazard, the process by which individuals are exposed to the hazard, the process by which exposure produces adverse effects, or the valuation of those effects. The court's role in risk management is addressed. Various decision-making approaches are compared, including applied social welfare theory, decision-maker cost-benefit analysis, and 'supre decision-maker decision analysis. All of the approaches discussed are said to derive their perspective and underlying logic from one or more of the following three distinct theories of decision-making: cost-benefit theory, decision theory, and social choice theory. These theories are defined and concerns and criticisms are expressed over the effectiveness and appropriateness of decision-making approaches. (NTIS)

****Dealing with Risk: The Planning, Management, and Acceptability of Technological Risk**
Griffiths, Richard F.
New York, Wiley, 1981
Type of Document: Book
Keywords: Industrial Safety; Risk Management
EPA Libraries: EJB HQ
Call Number: HD7261.D4

Development of Quantitative Risk Acceptance Criteria
Griesmeyer, JM; Okrent, D
California Univ., Los Angeles. Dept. of Chemical, Nuclear, and Thermal Engineering
Sponsor: Department of Energy, Washington, DC
Jan 81 54p
Contract No.: AS04-78ET35400
ALO-130

Some of the major considerations for effective management of risk are discussed, with particular emphasis on risks due to nuclear power plant operations. Although there are impacts associated with the rest of the fuel cycle, they are not addressed here. Several previously published proposals for quantitative risk criteria are reviewed. They range from a simple acceptance criterion on individual risk of death to a quantitative risk management framework. The final section discussed some of the problems in the establishment of a framework for the quantitative management of risk. (NTIS)

****Energy Risk Management**
Goodman, GT; Rowe, WD
Corporate Source: Vetenskapsakademiens Internationella Institut Fhor Energi Och Humanekologi. Beijerinstitutet, Sweden
New York, Academic Press, 1979
Type Document: Conference Proceeding
Keywords: Energy Facilities; Safety Measures; Environmental Aspects; Risk Management
EPA Libraries: EJB HW; ELB Cinn.
Call Number: TJ163.15.E54

Environmental Protection Agency's Regulatory Practices: The Impact of a Holistic Approach
Anzenberger, Lynn
Lafayette Coll, Dep of Chemical Engineering, Easton, PA
Environmental Progress; v 4 n 3 Aug 1985 p 155-160
Type Document: Journal article

The purposes of this report were to describe the separation of responsibility for the current environmental regulations and some of the regulatory problems this creates. As one possible solution to these regulatory problems, an integrated or 'holistic' approach to regulation was investigated, paying specific attention to cross media concerns. EPA's current efforts in addressing this issue was described and recommendations for further action were presented. (10 REF.) (COMP)

****Environmental Risk Assessment**
Chandler, Jerry LR
U.S. Food and Drug Administration, Center for Drugs and Biologics
BioEssays. 1986, Vol 5(4): 176-180

****Environmental Risk Assessment**
Whyte, Anne VT; Burton, Ian
Corporate Source: Scientific Committee on Problems of the Environment (SCOPE)
Chichester, England, J. Wiley, 1980.
Type Document: Series: SCOPE Report 15
Keywords: Environmental Impact Analysis; Pollution, Risk Management; Environmental Health
EPA Libraries: EJB HQ; EHA R1, EJE OTS; EKB RTP; EKD Athens; ELB Cinn.
Call Number: TD194.6 E65

****Environmental Risk Management** (Editorial)
Abelson, PH
Science; Vol. 226, ISS 4678, 1984, P1023

General Concept of Risk: Risk in Perspective
Whyte, Anne
Univ of Toronto, Ont. Can
Proceedings of the 28th Ontario Industrial Waste Conference
Toronto, Ontario, Canada, 1981 Jun 14-17, p3-36
Sponsor: Ont Minist of the Environ, Can
E.I. Conference No.: 00811
(EI)

****Guide to Personal Risk Taking**
Byrd, Richard E.
New York, AMACOM, 1974
Keywords: Risk; Middle Managers
EPA Libraries: ELB CINC; EOA R8
Call Number: HD61.B95

Group Influence on Individual Risk Taking
Wallach, Michael A.
Journel of Abnormal and Social Psychology. 1962, Vol. 65,
No. 2, 75-86
EPA Libraries: EJB HQ

****Ideology and Environmental Risk Management**
Miller, Alan
Univ. of New Brunswick, Canada
Environmentalist, Spring 85, V5, N1, P21(10)
Journal article: The influence of ideology, a concept that has both psychological and political implications, on an individual's approach to environmental risk is explored. Environmental ideologies play an important role in environmental decisions; they are held in place by sociopolitical and psychological factors. The technocratic mode not only dominates the current scene but may do so for the foreseeable future. An extended and integrated form of environmental risk management requires a greater role for the non-dominant ideologies. (1 diagram, 3 photos, 33 references, 3 tables) (ENVL)

An Introduction to Risk Management
Crockford, Neil
Dover, NH, Woodheed-Faulkner Pubs. Ltd., 1984
Type Document: Book
ISBN: 0-85941-116-8

****Learning to Manage Risk**
Russell, Milton
Research Management xxix (4) Jul-Aug 86
Dealing successfully with technological risk will require overcoming the strong resistance to risk management. Industry can do much to help.

****Managing Risk Perceptions**
Fischhoff, Baruch, Univ of Oregon
Issues in Science and Technology, Fall 85, V2
Journal article: The continuing public debate over nuclear power offers proof of the public's determination to have a say in the management of hazardous new technologies. The public's perception of risks is an important element in the development of public policies of risk management. The tendency of people to simplify issues, to ignore evidence that contradicts their current beliefs, and to base their perceptions of relative risk on what they see in the news media are observed. Some strategies are recommended that risk managers might pursue when dealing with the public about risk controversies. (ENVL)

Measuring and Managing Environmental Risk
Douglas, JR
Electric Power Research Institute Journal 10:6-13, Jul/Aug 85
Illustrated
Source: Applied Service and Technology Index 1985

Methods in Risk Management - a Working Paper
Uppuluri, VRR
Oak Ridge National Lab., TN
Sponsor: Department of Energy, Washington, DC.
Report No.: CONF-8410171-5 1984 8p
US/Japan workshop on tritium radiobiology and health physics.
Tokyo, Japan, 29 Oct 1984
Contract No.: AC05-840R21400
DE85008360/XAB

The methods in Risk Analysis to determine the health and environmental effects of hazards to individuals and society are evolving in this rapidly developing field. In this paper, we briefly discuss the current distinctions between Risk Assessment and Risk Management, and discuss some methodological issues. We conclude this paper with a method useful for prioritization in connection with the environmental, health, and safety deficiencies at a number of sites. (9 references) (NTIS)

****Of Acceptable Risk: Science and the Determination of Safety**
Lowrence, William W.
Los Altos, CA, W. Kaufman 1976
Keywords: Risk Management; Product Safety; Industrial Safety
EPA Libraries: EHA R1; EJB HQ; ELA R5; ESA R10; EHB Narrag;
EJE OTS: ELD Duluth; EIA R2; EKB RTP; ERB Las Vegas
Call Number: TS175.L68

****On the Use of Confidence Levels in Risk Management**
Kastenberg WE; Solomon KA
Mechanical, Aerospace and Nuclear Eng., Sch. Eng. Applied
Sci., Univ. Calif., Los Angeles, CA 90024
J Hazard Mater 10(2-3). 1985. 263-278

A framework for incorporating uncertainty in risk management is developed and applied to two aspects of decision making: meeting standards or safety goals, and cost-benefit criteria. The framework is applied to several case studies including toxic chemicals in water, failure of civil engineering structures and nuclear power plants. The framework proposes that decisions be based on a level of confidence, in addition to comparing best estimate or point values with standards and goals. (NLM)

****Perspectives on Benefit-Risk Decision Making**
A Report of a Colloquium Conducted by the Committee on Public Engineering Policy
Corporate Source: National Academy of Engineering. Committee on Public Engineering Policy
Washington, DC, National Academy of Engineering, 1972
Type Document: Report
Keywords: Decision-making; Risk-taking (Psychology)
EPA Libraries: ENA R7; EOA R8; EJE OTS Doc NAS-125
Call Number: HD69.D4N3

****Principles for Use of De Minimis Concepts in Risk Regulation**
Executive Summary
Corporate Source: National Science Foundation, Division of Policy Research and Analysis
Arthur D. Little 1984
Type Document: Report
Keywords: Risk Management
EPA Libraries: EJE OTS
Call Number: Doc NS-50

****Risk Analysis and Scientific Method: Methodological and Ethical Problems with Evaluating Societal Hazards**
Shrader-Frechette, KS
Boston, D. Reidel, c. 1985
Type Document: Book
Keywords: Technology Assessment, Decision Making, Risk
EPA Libraries: EKE OAQPS - RTP
Call Number: T174.5 S48

****Risk Analysis in the Private Sector**
Proceedings of the Society for Risk Analysis. Volume 3
Whipple, Chris, Electric Power Research Institute; Covello, Vincent T, National Science Foundation (eds.)
Corporate Source: Society for Risk Analysis
New York, Plenum Press, 1986
516 p., illustrated 0-306-41924-6
Type Document: Series: Society for Risk Analysis. Vol. 3
Keywords: Chemical Risk Management, Occupational Risk Analysis, Ethics and Values in Risk Analysis, Risk Analysis and Risk Management: Issues, Methods, and Case Studies
Source of Abstract: Publisher

There has been a gradual shift of emphasis in risk analyses--from studies conducted in support of federal regulatory decision-making to private sector analyses aimed at preventing or reducing potential adverse environmental or health effects. This volume

focuses on risk analysis in the private sector, gathering contributions from such fields as toxicology, chemistry, biology, and many others.
EPA Libraries: EJB HQ

**Risk and Decision Making: Perspectives and Research
Raiffa, Howard
Corporate Source: National Research Council.
Committee on Risk and Decision Making
Washington, DC, National Academy Press, 1982
Type of Document: Book
Keywords: Risk-taking (psychology); Decision-making; Technology Assessment
EPA Libraries: EJB HQ; EJE OTS; EJB HQ Ref
Call Number: HD61.R54 1982

**Risk Assessment and Management: Framework for Decision Making
Environmental Protection Agency, Washington, DC. Office of the Administrator.
Report No.: EPA/600/9-85/002
Dec 84 38p
PB85-170157/XAB

The risk assessment and risk management initiatives described in this report are tools which will help make possible more efficient protection of the environment and human health. The authors expect to gain the following specific management advantages: Risk assessment and risk management help set priorities. There are thousands of chemicals in commerce and an unknown number of contaminants and unintended by-products. Some of these could be important as pollutants, and as such, are proper targets for regulation if they pose significant risks to health or the environment. The authors do not have the budget, nor will we ever have the time, to test each chemical exhaustively. Screening by estimates of potential risk reduction is an attractive basis for comparing regulatory priorities. They can use risk analytic methods to help sort problems in terms of the likelihood that the Agency can do something constructive and effective to improve public health and the environment. Risk management provides a context for balanced analysis and decision-making. Toxic chemicals are legitimately frightening: they can and do cause cancer and other diseases. The trouble is that we are exposed to a complex, highly dilute mixture of chemicals, taken in through air, water, and food. When disease strikes, cause and effect are seldom clearly linked. The Agency can contribute to rational discussion by exposing the scientific basis for the risk, including the confidence they have in the estimate; placing the risk reduction expected from the regulation in context with other risks and other opportunities for risk reduction; and explaining the values on which the balancing judgments have been made. Risk assessment and management produce more efficient and consistent risk reduction policies. EPA's patchwork of authorities for controlling pollution needs to be woven together more coherently, beginning at the analytical level and continuing through to the regulatory decision. Some important differences - defined by statute - in the ways the laws manage risk will always remain, but a risk management approach can use their remaining administrative flexibility to make more efficient use of the Agency's and society's resources to reduce risk and to make the Agency's actions more consistent. (NTIS)

****Risk Assessment and Risk Management**
Journal of Hazardous Materials 10: 163-454, Jul 85
Bibliography; Maps; Diagram

****Risk Assessment and Risk Management**
Cheney, David W., US Congressional Research Service
Env Education Report, Apr 85, V13, N4, P21(7)
Journal Article: One approach to improve the regulation of risks is to improve the quality of scientific information used in making regulatory decisions. The role of information in risk regulation is explored, as are options to improve the quality of this information. A distinction is made between risk management and risk assessment. Risk management can be enhanced by: improving the science upon which assessments are based; developing guidelines for performing assessments; establishing procedures for peer review of risk assessments; and centralizing risk assessment in each agency or throughout all agencies. (ENVL)

****Risk Assessment and Risk Management**
Solomon, KA (ed)
J. Hazard. Mater. 1985; 10(2-3) 293pp
CBAC COPYRIGHT: CHEM ABS Book; risk hazardous material Safety risk hazardous material book; Chemicals Risk assessment and management in relation to Hazardous; Handling of materials of hazardous substances, risk assessment and management in relation to; Safety of hazardous materials, risk assessment and management in relation to; Wastes Risk assessment and management in relation to Hazardous. (NLM)

Risk Assessment and Risk Management Decision-making for Chemical Exposure
Morgan MG
Dep. Eng. Public Policy, Carnegie-Mellon Univ., Pittsburgh
Environ. Exposure Chem. Vol 2, 1985, 107-43
CBAC COPYRIGHT: CHEM ABS Review chem exposure risk assessment; Health hazard from exposure to chem., risk assessment and management in relation to; Process simulation of exposure to chem. and effects, in risk assessment and management Biological. (NLM)

****Risk Assessment/Risk Management**
Barber, Walter C.; Faden, Ruth; Ruckelshaus, William D.; Nisbet, Ian C.
Chemical Waste Management, IL
Env Forum Sep 84, V3, N5, P17(16)
Journal article: EPA Administrator William Ruckelshaus has emphasized an evolving role for risk analysis in the separation of risk assessment from risk management. Scientific processes would be applied to assessing risk, and political processes would be invoked in managing it. Opposing and supporting views concerning this philosophy are expressed. (11 photos.) (ENVL)

****Risk Assessment Techniques: A Handbook for Program Management Personnel**
Corporate Source: Fort Belvoir, Defense Systems Management College
Washington, D.C., Government Printing Office; 1983
Type Document: Book
Keywords: Handbooks; Risk Management
EPA Libraries: EHA R1 01A0003895; EJA R3
Call Number: UA23.985 1983

****Risk Assessments/Risk Management for Environmental Uses of Biological Agents**
Anderson EL; Albert RE; Kamely D
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment
Sponsor: New York Univ. Medical Center, NY
Report No.: EPA/600/D-85/285 1985 13p
Prepared in cooperation with New York Univ. Medical Center, NY
Pub. in Banbury Report 22: Genetically Altered Viruses and the Environment, p27-38 1985
Type Document: Journal article
PB86-131810
Through recent advances in molecular biology, especially biotechnology, regulatory agencies are faced with evaluating a range of biological agents for potential risks they pose to human health and the environment. Although biological risks are of relatively recent concern, this has not been the case for chemicals. Over the past several years, the Environmental Protection Agency (EPA) has developed methodologies for assessing health risks associated with chemical pollutants, especially chemical carcinogens. In anticipation of regulating biological agents, including genetically engineered microorganisms, the Agency must stimulate the generation of a solid scientific basis in order to adapt its present, chemically based risk assessment approaches to biological agents.

Risk/Benefit Analysis
Crouch Edmund AC; Wilson Richard
Cambridge, Mass., Bellinger Pub. Co., 1981
Type Document: Book
Keywords: Risk-Evaluation; Risk Management
EPA Libraries: EJB HQ; EJE OTS; EKB RTP; ELB Cinn;
ELC Ann Arbor; ERA R9
Call Number: HD61.C77

Risk/Benefit Analysis in Water Resources Planning and Management.
Proceedings held at the Asilomar Conference Grounds,
Pacific Grove, CA, September 21-26, 1980
Haines, Yacov Y
Corporate Source: Engineering Foundation Conference on Risk/Benefit
Analysis in Water Resources Planning and Management.
Universities Council on Water Resources
New York, Plenum, 1981
Type Document: Conference Proceedings
Keywords: Water Resources Development--Congresses;
Risk--Congresses; Decision Making--Congresses; Technology
Assessment--Congresses
EPA Libraries: ELB Cinn; ESA R10
Call Number: TC401.E53 1980

Risk-Benefit Analysis for Industrial and Social Needs
Moll, Kendall D., Stanford Research Institute;
Thansky, Dennis P., George Washington University
American Industrial Hygiene Association Journal, V.38,
Apr 1977, p.153-192

This study develops a decision method for evaluating the social acceptability of industrial controls on hazardous materials. Decisions are based on a "multiple criteria approach" that jointly considers measures such as risk-benefit tradeoff, minimum reducible health risk, maximum acceptable cost and implicit value of human life. Health risks are calculated by combining separate estimates of production and usage patterns, emissions to air and water, effectiveness of controls, pollutant dispersion and human susceptibility. Economic benefits consider employment, trade and consumer impacts, as well as direct costs of controls. The analysis focuses on asbestos as an example hazard. Relative values of hazard reduction alternatives are examined for asbestos manufacturing exhaust filters and for asbestos substitutes in brake linings. Preliminary calculations indicate risk reductions of these alternatives cannot justify their social costs.

EPA Libraries: EJB HQ

****Risk, Choice, and Prediction: An Introduction to Experimentation**
Youden, William John
North Scituate, Mass., Duxbury Press, [1974]
Type Document: Book
Keywords: Probabilities
EPA Libraries: ELB Cin.
Call Number: QA273.15.Y68 1974

****Risk Evaluation and Management**
Covello, Vincent T.; Menkes, Joshua; Mumpower, Jeryl (eds)
National Science Foundation
New York, Plenum, 1986
Approx. 725 pp., illustrated 0-306-41978-5
Type Document: Series: Contemporary Issues in Risk Analysis, Volume 1
Keywords: Society and Behavior, Risk Perception, Risk Analysis Methods, Risk Management Strategies
Source of Abstract: Publisher

Social and behavioral perspectives are becoming increasingly important in dealing with the complex problems of risk management. The inaugural volume of this new series explores many of the issues involved in the behavioral and social study of risk. The distinguished panel of contributors, representing a diverse range of fields including decision science and philosophy, focus on risk perception, risk analysis methods, and risk management strategies.

EPA Libraries EJB HQ

****Risk Management and EiA: Research Needs and Opportunities**
Grima AP; Timmerman P; Fowle CD; Byer P
Institute for Environmental Studies, University of Toronto
Hull, Quebec, Canada, Canadian Environmental Assessment Research Council, 1986
Type Document: Background Paper
Keywords: Risk; Uncertainty; Public Perception of Risk; Risk Evaluation; Indicators of Risk Mitigation; Economic Risk
ISBN 0-662-14775-8
EPA Libraries: EJB HQ

Risk Management Guide
Briscoe GJ
EG and G Idaho, Inc., Idaho Falls
Sponsor: Department of Energy, Washington, DC
Report No.: DOE/SSDC-76-45/11-REV.1; SSDC-11-REV.1
Sep 82 226 p
Contract No.: AC07-761D01570
DE84000492

The role of risk assessment is to provide the necessary information to make decisions regarding the cost effective commitment of resources to accident prevention and reduction. Risk assessment can also be used to determine if a proposed action is accept-

able in those situations where it is impractical to eliminate particular hazards. A limitation in this process is that estimates of future losses are necessarily based on probabilities, statistics, and even subjective judgment; and therefore can never be precise. The decision to allocate resources, thus, is always made in the face of uncertainty. The purpose of risk analysis is to reduce that uncertainty as much as practical by providing a framework for the incorporation of all available information regarding the costs and risks of various alternatives. This guide provides some methods for analyzing and presenting this data to management.
(ERA citation 09.001362) (NTIS)

Risk Management in a Multi-Objective Decision-Making
Haimes YY
Case Inst. of Tech., Cleveland, OH
15 Jul 83 5p
This article is from 'Management of Risk and Uncertainty in Systems Acquisition: Proceedings of the 1983 Defense Risk and Uncertainty Workshop
Held at Fort Belvoir, Virginia on 13-15 July 1983,
AD-A136 230, p217-221.
AD-P002-317/6
The thesis of this paper is grounded on the premise that the analysis of risk and uncertainty -- and ultimately the management of risk -- can be meaningful and effective only when considered as an integral part of the decision-making process. Five major elements or steps that encompass the risk assessment process -- risk identification, risk quantification, risk evaluation, risk acceptance and risk management -- are discussed. The risk assessment is shown to ultimately lend itself to a mult-objective decision-making process. The surrogate worth trade-off method (a multi-objective optimization method) and four risk assessment methodologies -- the multi-objective statistical method, the partitioned multi-objective risk method, the risk/dispersion index method and the uncertainty/sensitivity index method are briefly discussed. (Author) (NTIS)

****Risk Management of Existing Chemicals**
Proceedings of a Seminar Conducted December 8-9, 1983, Washington, DC
Corporate Source: Chemical Manufacturers Association
Rockville, MD; Government Institutes, Inc., 1984
Type Document: Conference Proceedings
Keywords: Chemicals--Manufacture and Industry--Toxicology; Industrial Toxicology; Risk Management
EPA Libraries: EJB HQ; EHB Narragansett; EKE RTP OAQPS RA1229.C517; ELB Cinn RA1199.R567 1984
Call Number: HD9650.C52

****Risking: How to Take Chances and Win**
Viscott, David S
New York, Simon and Schuster, 1977
Type Document: Book
Keywords: Risk-taking (Psychology)
EPA Libraries: ELB Cinn
Call Number: BF611.V57

Role of Liability Preferences in Societal Technology Choices: Results of a Pilot Study
Cantor R; Rayner S; Braid B
Oak Ridge National Lab., TN
Sponsor: Department of Energy, Washington, DC.
Report No.: CONF-8510223-1 1985 150
Annual meeting of the Society for Risk Analysis,
Alexandria, VA, 6 Oct 1985.
Type Document: Conference Proceedings
Contract No.: AC05-840R21400
DE86003274/XAB

At the 1983 Annual Meeting of the Society for Risk Analysis, Steve Rayner presented a paper that challenged the conventional wisdom of risk management research. In that paper, he argued that resolving the question, "How safe is safe enough," is less important in making societal technology choices than "How fair is safe enough." Adopting the fairness question as the concern of risk management would imply that the process of technology choice explicitly recognize the preferred principles different parties hold with respect to obtaining consent from those affected by the risks, distributing the liabilities, and justifying trust in the relevant institutions. This paper discusses a recent empirical pilot study which explored the fairness hypothesis in the context of nuclear power. Individual interviews and focus groups were conducted to examine whether or not preferred principles for liability distributions were consistent with those suggested by the cultural characteristics of the constituency. The results suggest that for this type of societal technology choice, violation of these preferred principles may be a major source of the conflict between different constituencies. Additionally, the study contributes towards the development of a new approach in risk management that combines the cultural model of risk perceptions with the decision-theoretic approaches found in economics and psychology. (NTIS)

****The Roles of Information, Discussion, and Consensus in Group Risk Taking**
Wallach, Michael A.; Kogan, Nathan
Journal of Experimental Social Psychology, 1: 1-19, 1965
EPA Libraries: EJB HQ

****The Scope of Environmental Risk Management**
O'Riordan, Timothy
Univ of East Anglia, UK
Ambio (1979). V8, N6, P260 (5)

Feature Article: The concept of environmental risk management encompasses three elements: cost-benefit analysis, environmental impact analysis, and risk assessment. Because environmental risk management couples scientific analyses to political judgments, too few decision-making institutions are adequately equipped to handle delicate and potentially divisive combinations. There must be continuity between political matters and scientific methods. (3 Diagrams, 17 References) (ENVL)

Uncertainty Analysis for Engineers
Uhl VW; Lowthian WE
New York, American Institute of Chemical Engineers, 1982
Type document: Series: AIChe Symposium Series: No. 220
Keywords: Engineering, Risk Management, System Analysis
EPA Libraries: ELB Cinn.
Call Number: TA190.U53 1982

Use of Environmental Health-Risk Analysis for Managing Toxic Substances
McKone, Thomas E
Lawrence Livermore Natl Lab, Livermore, CA
Conference Title: Proceedings - 78th APCA Annual Meeting Detroit, MI, June 16-21 1985
Sponsor: APCA, Pittsburgh, PA
Source: Proceedings, Annual Meeting - Air Pollution Control Association 78 v 3, Publ by APCA, Pittsburgh, PA, Pap 85-33. 5, 16p 1985
E.I. Conference No.: 07333
Keywords: *Environmental Protection; Hazardous Materials--Toxicity; Health Care; Mathematical Models; Environmental Health Risk Analysis; Toxic Substance Management; Compartment Models; Decay Constants; Intermedia Transfer Coefficients; Human Exposure and Cancer Risk

The process of environmental health-risk analysis using a multi-media model is developed in three phases. In the first phase, the concept of using compartment models for modelling chemical fate is described. The second phase involves the development of decay constants and inter-media transfer coefficients for use in the GENOTOX model, which is a cross-media model used in the analysis. In the third phase, environmental concentrations are linked to human exposures and cancer risk using an exposure model that accounts for intake via seven pathways: inhalation; ingestion of drinking water; fruits and vegetables; milk, meat and dairy products; fish; and soil; and dermal absorption. Following the development of the models, there is an applications section in which the models are applied to tritium, arsenic and TCDD. (21 REFS) (EI)

POLICY .... *includes federal, state and local policy, science, public and regulatory policy.*

Alternative Risk Management Policies for State and Local Governments
(Final rept.)
Okrent, David
California Univ., Los Angeles. School of Engineering and Applied Science.
Sponsor: National Science Foundation, Washington, DC
Report No.: UCLA-ENG-8240; NSF/PRA-82020
Jun 82 173p
Contract No.: NSF-PRA79-10804
PB83-128983

A study of risk management at the state and local levels is described and some proposals for improvement are considered. Risk management is distinguished from insurance management in that it is unconcerned with fault in the legal sense and tries to anticipate losses to life and health as a means of devising corrective strategies. Two case studies, one of seismically substandard buildings in Los Angeles and one involving risks from drinking water, are presented. A wide variation in risk management is shown to exist among states and within states and, at the local level, the variation is shown to be even greater. It is found that quantitative grasp of risk seldom exists in state and local government. (NTIS)

****Application of the NSF/PRA (National Science Foundation/Policy Research and Analysis) Risk Analysis Program Results to Risk Management/Safety Policy Formulation**
(Final rept.)
Okrent D; Kastenberg WE; Apostolakis GE; Okrent ND; Szabo J
California Univ., Los Angeles. School of Engineering and Applied Science
Sponsor: National Science Foundation, Washington, DC., Div. of Policy Research and Analysis
Report No.: UCLA-ENG-8432; NSF/PRA-84029
Dec 84 347p
See also PB86-107364. Sponsored by National Science Foundation, Washington, DC., Div. of Policy Research and Analysis
Contract No.: NSF-PRA83-05097
PB86-107356/XAB

The text discusses the application of a range of research results on risk analysis to six sets of risk management situations: (1) asbestos in schools; (2) hazardous chemical waste sites; (3) indoor air pollution; (4) transportation of hazardous materials; (5) carcinogens and mutagens in drinking water; and (6) an industry employing bulk quantities of a hazardous material such as dioxin. Recommendations for achieving increased use of NSF/PRA sponsored studies by risk managers are included. (NTIS)
EPA Libraries: EJB HQ

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Application of the NSF/PRA (National Science Foundation/Policy Research and Analysis) Risk Analysis Program Results to Risk Management/Safety Policy Formulation. Executive Summary
Okrent, D.; Kastenberg, E.W.; Apostolakis, G.E.
California Univ., Los Angeles. School of Engineering and Applied Science.
Sponsor: National Science Foundation, Washington, DC., Div. of Policy Research and Analysis.
Report No.: UCLA-ENG-8432(ES): NSF/PRA-84026 Dec 84 21p
See also PB86-107356. Sponsored by National Science Foundation, Washington, DC., Div. of Policy Research and Analysis
Contract No.: NSF-PRA83-05097
PB86-107364/XAB

The summary addresses the application of research results emanating from the NSF/PRA Risk Analysis Program to six risk management situations: (1) asbestos in schools; (2) hazardous chemical wastes; (3) indoor air pollution; (4) transportation of hazardous materials; (5) carcinogens and mutagens in drinking water; and (6) an industry employing bulk quantities of a hazardous material like dioxin. A structured approach to the application of decision analysis is provided, alternatives to regulation are identified and described, and some insight as to how the public should perceive risk is offered. The need for further consideration of the problem of indoor radon is highlighted and recommendations for achieving increased use of NSF/PRA sponsored studies by risk managers are included. (NTIS)

****Classification of Risks (Alternative Risk Management Policies for State and Local Governments)**
Solomon, Kenneth A.; Meyer, Marshall W.; Szabo, Jacob; Nelson, Pamela
California Univ., Los Angeles. School of Engineering and Applied Science.
Sponsor: National Science Foundation, Washington, DC.
Report No.: UCLA-ENG-8245; NSF/PRA-82024 May 82 64p
Contract No.: NSF-PRA79-10804
PB83-129007

Societal risk management is defined and the hazards to which society might be exposed are noted. Nine alternative taxonomies are suggested which categorize risk by the situation in which the risk is encountered, by the cause of the risk, by the risk itself, by the manner in which the risk is perceived, by the magnitude of the risk, by the geographic division of risk management, by the dollars expended to manage the risk, by the ratio of dollar damage to dollar benefit, and by the management of the risk. The role of local government in risk management is examined. (NTIS)
EPA Libraries: EJB EPA Libraries EJB HQ

Determining Risks to Health: Federal Policy and Practice
U.S. Department of Health and Human Services. Task Force
on Health Risk Assessment. 410p
Dover, MA, Auburn House Publishing Co., 1986

This book is based on a 1985 report to the Secretary of the Department of Health and Human Services, by an intramural task force instructed to review the department's activities in health risk assessment and management. The report is in the book appendix... The official report presents a balanced and lucid summary of the philosophy of risk, the methods of measurement, the problems in dealing with the uncertainties in measurement, and the major issues of risk management. Recommendations are made for closer coordination of governmental activities, review of the peer-review systems to ensure more public participation, more training in risk management, and increased research in general toxicology, epidemiology, and research, which would improve the methodology in the estimation and projection of risk...

****Environmental Protection: Laying the Foundation for the Year 2000**
Russell, Milton
Environmental Forum; 4:7-12 F '86, chart
EPA's risk management approach; based on address
(PAIS)

Federal Activities in Risk Assessment and Risk Management in Biotechnology
Bulkley, BH
Off. Sci. and Technol. Policy, White House, Washington, DC
1985 AAAS Annual Meeting 8520021 Los Angeles, CA,
26-31 May 1985
American Association for the Advancement of Science (AAAS)
Washington, DC
(CPI)

****Food and Drug Administration: A Plan for Action**
Food and Drug Administration, Rockville, MD. Executive
Secretariat
Report No.: FDA/ES-86/9
Jul 85 71p
PB86-107117/XAB

FDA's Plan for Action designates FDA's highest priorities and charts a broad course for the Agency's policy and management directions in the years ahead. The plan was based on extensive meetings that the Commissioner had with persons both inside and outside of government. This action plan consists of the following: (1) New Drug Review Process - specifically accelerate and improve review of human drugs; (2) Medical Devices Program - implement the 1976 Medical Device Amendment to facilitate marketing products; (3) Postmarketing Surveillance - strengthen activities to enhance protection against new and unforeseen risks with marketed products; (4) Risk

Assessment - evaluate, test and assess the risk to humans of compounds in the food supply causing cancer in laboratory animals; (5) Risk Management - improve risk taking process by prudent use of education, enforcement, regulation and voluntary compliance; (6) Food Safety - resolve food safety issues by administrative and legislative means; (7) Nutrition - broaden program to advance nutrition science, increase consumer awareness and assurance of quality of food supply; (8) New Technologies - develop specialized capabilities in medical developments, food supply changes, biotechnology and microelectronics; (9) Health Fraud - reduce health hazard and fraud by increasing enforcement activities and professional and consumer awareness; (10) Internal Management - improve Agency by career advancement, information systems, laboratory research, resource allocation and science base. (NTIS)
EPA Libraries: EJB EPA Libraries: EJB HQ

****Improving the Use of Risk Assessment in Regulation**
Rodricks, Joseph V
Environ, Washington, D.C.
Comments on Toxicology. 1986. Vol 1(1): 65-75
(8 REFS)

****The Management and Assessment of Risk from Recombinant Organisms**
Fisher, E.
Journal of Hazardous Materials July 1985, Vol. 10, Nos. 2+3,
special issue, p. 241-261. (58 ref.)
Description of the "untraditional" path followed to develop risk management policies for recombinant DNA research in the U.S.A. Aspects covered: the recombinant DNA technique; potential risks; historical and institutions involved in rulemaking; the National Institutes of Health (NIH) guidelines; risk assessment. (NLM)

****Office of Science and Technology Policy. Coordinated Framework for Regulation of Biotechnology**
Federal Register, v.51(123)/June 26, 1986: 23302-23350

Problems of State and Local Risk Management: An Overview (Alternative Risk Management Policies for State and Local Governments)
Bordas, William
California Univ., Los Angeles. School of Engineering and Applied Science.
Sponsor: National Science Foundation, Washington, DC.
Report No.: UCLA-ENG-8246; NSF/PRA-82026 May 82 30p
Contract No.: NSF-PRA79-10804
PB83-128991
State and local risk management is defined as a four-part process characterized by risk identification, risk assessment, risk acceptance, and risk monitoring and intervention. Significant differences are found to exist in the comprehensiveness of risk management policies between both state and local agencies and among state agencies. In a

large state such as California, agencies demonstrate a significant capacity to engage in comprehensive decision making. They identify new sources of risk, assess their efforts and set standards of risk acceptance. In smaller states, more selective risk management is evident due to resource constraints. Risk management policy at the state and local levels is evaluated according to the decision strategies that are employed. (NTIS)

Protecting the Reproductive Health of Workers: Problems in Science and Public Policy
Valentine JM; Plough Al
Boston University
J Health Polit Policy Law: Vol 8, ISS 1, 1983, p144-63
This paper first reviews the scientific problems involved in assessing the effects on reproductive health of toxic substances in the work environment. It then describes the current status of regulatory policies designed to control workers' exposures to toxins believed to affect reproduction. Finally, the paper discusses the relationship between scientific uncertainty and regulatory strategies. Because demonstrating reproductive health effects is extremely difficult, the assessment of the health risks of exposures, as well as of the economic costs of regulation, is probabilistic. Therefore, uncertainty is inherent in any regulatory decision in this area. And the case of reproductive risks is illustrative of the more general problem of protectiong the health of workers within a context of scientific uncertainty, and within a highly charged political environment characterized by anti-regulatory sentiment and industries in economic decline. (NLM)

****Reducing Risk?**
Stanfield, Rochelle L.
National Journal (1986). 18(33-34): 2032
The Reagan Administration's frontal assault on environmental regulations did not work five years ago, so now it's preparing an attack from the rear.

****Regulatory Program of the United States Government**
U.S. Executive Office of the President; Office of Management and Budget
Washington, DC, The Offices, 1985
Keywords: Administrations Regulations; Delegated Legislation
Notes: Issued each April 1 to cover the following 12 months
EPA Libraries: EJE OTS; ESA R10
Call Number: KF70.2 A2U58

****The Revisionist: William D. Ruckelshaus**
Mosher, Lawrence
Amicus J Spring 84, V5, N4 P32 (6)
Journal article: In his second tenure as EPA Administrator, William D. Ruckelshaus seeks to revamp how the entire federal bureaucracy deals with the assessment and management of environmental risks. Uniformity in toxic substance regulation must be

attained amongst diverse federal agencies. Regulatory bodies must more distinctly distinguish their risk-assessment from their risk-management functions. Risk assessment, rather than management, concepts and techniques will be pursued by EPA in protecting public health. (2 drawings, 1 photo) (ENVL)

Risk Analysis and the Interface of Science, Law, and Policy
Middlekauff, RD
Food Technology 38:97-102
Bibliography
Source: Applied Science and Technology Index 1985

****Risk Analysis, Institutions, and Public Policy**
Hadden, Susan G
Port Washington, NY; Associated Faculty Press, 1984
Type Document: Series: Policy Studies Organization
Series Publication
Keywords: Risk Management -- Addresses, Essays, Lectures;
Risk -- Government Policy -- U.S. -- Essays, Lectures
EPA Libraries: EHA R1
Call Number: HD61.R56 1984

****Risk and Trust: The Role of the Regulatory Agencies**
McGarity, Thomas O.
Environmental Law Reporter 16: Aug 86, 10198-204

Risk Assessment, Acceptability and Management
Proceedings of a seminar: report/prepared by the Congressional Research Service, Library of Congress; for the Subcommittee on Science, Research, and Technology; transmitted to the Committee on Science and Technology, U.S. House of Representatives, 97th Congress, first session, November 1981.
Corporate Source: United States Congress, House, Committee on Science and Technology, Subcommittee on Science, Research and Technology, Library of Congress, Congressional Research Service
Washington: U.S. G.P.O., 1981. vii, 116p ; 24 cm.
Keywords: Risk management-United States
(GPO)

Risk Assessment Criteria for Risk Management at EPA
Goldstein, BD
EPA, Washington, DC
2nd Annual National Preventive Medicine Meeting -- Prevention '85 8510202, Atlanta, GA 28-31 Mar 1985
Association of Teachers of Preventive Medicine, American College of Preventive Medicine Prevention '85, Washington DC
(CPI)

****Risk Assessment in the Federal Government: Managing the Process**
National Research Council (US). Committee on the Institutional Means for Assessment of Risks to Public Health
Washington, D.C., National Academy Press, 1983
Type Document: Book
Keywords: Public Health; Decision-making; Risk Management
EPA Libraries: EHA R1; EIA R2; EIC Edison; EJB HQ; EJE OTS; EKB RTP Doc NAS/084; EKD Athens; ELA R5; ELB Cinn; ELC Ann Arbor; EMA R6; EOA R8; EOB NEIC; ERA R9; ESA R10; ESB Corvallis
Call Number: RA445.R57

Risk Management Practices in Local Communities: Five Alternatives (Alternative Risk Management Policies for State and Local Governments)
Meyer, Marshall W; Solomon, Kenneth A
California Univ., Los Angeles. School of Engineering and Applied Science.
Sponsor: National Science Foundation, Washington, DC.
Report No.: UCLA-ENG-8242; NSF/PRA-82023
May 82 49p
See also PB83-132993
Contract No.: NSF-PRA79-10804
PB83-133009

The current state of risk management practices in local communities in the United States is discussed and some alternatives to present policies are offered. The concept of risk management as presently used in local government is examined and results of a survey of local and state risk managers is presented. It is shown that local risk managers do not tend to think of risk quantitatively and that their principal activities are directed toward compliance of standards set elsewhere. The identification of new hazards and estimation of risks is shown to be largely absent from local and to some extent state levels of government. It is suggested that local communities should be given more timely scientific data concerning risk and should be freed from Federal and state policies mandating levels of acceptable risk. (NTIS)

****Risk Quantitation and Regulatory Policy**
Hoel, David G; Merrill, Richard A; Perera, Frederica, P
Cold Spring Harbor, NY; Cold Spring Harbor Laboratory, 1985
Type Document: Book Series: Banbury Report 19
Keywords: Toxicology; Mathematical Models; Risk Management; Epidemiology; Environmental Health; Government Policy
EPA Libraries: EJE OTS; EKB RTP; ELB Cin.
Call Number: RA1199.R57 1985

****The Role of Congress in Risk Management**
Green, Harold P
Environmental Law Reporter 16:Aug 86, 10220-3

****The Scientific Framework for Regulation Decisions**
Dixon, Robert L
U.S. Environmental Protection Agency, Office of Health Research, Washington, DC
Comments on Toxicology. 1986. Vol. 1(1): 77-84

Understanding Risk Management: A Guide for Governments
Coe, Charles
Athens, GA., Univ. of Georgia, Institute of Government, 1980, 70p.
Type Document: Book
ISBN: 0-89854-063-1

LEGAL ASPECTS .... *includes law, courts, regulations; mediation vs. litigation.*

****Dealing with Risk: The Courts, the Agencies and Congress**
Light, Alfred R
Hunton & Williams, Richmond, Virginia
Paper presented at the Fourteenth Annual Airlie House Conference on the Environment. May 17-18, 1985, Airlie House, Warrenton, Virginia
To be published in Environmental Law Quarterly
EPA Libraries: EJB HQ; ELB Cinc.

Dealing with Risk - The Courts, the Agencies and Congress
Fourteenth Annual Airlie House Conference on the Environment. Proceedings held May 17-18, 1985, Airlie House, Warrenton, Virginia
Sponsored by: The Standing Committee on Environmental Law, Public Services Division, American Bar Association
Keywords: Risk Assessment; Risk Management; Regulatory Agencies, Courts, Congress, Integrated Environmental Management; Risk-Benefit Analysis

****Decision Making for Regulating Chemicals in the Environment: A Report**
Environmental Studies Board. Committee on Principles of Dcision Making for Regulating Chemicals in the Environment
Washington, DC, National Academy Press, 1975
Keywords: Environmental Law; Chemical Regulation
EPA Libraries: EHB Narrag; EKB RTP NAS/057; EIA R2 KF3958. C-EN; EJB HQ; EJE OTS; EKA R4; ELA R5; ELB Cinn; ELD Duluth; A R6; EOA R8; ESA R10
Call Number: KF3958.E5

****Don't Gut Worst Case Analysis**
Yost, Nicholas C.
Environmental Law Reporter (1983). 13: 10394-10397

****Legal Considerations in Risk Assessment Under Federal Regulatory Statutes**
Hutt, Peter Barton
In: Assessment and Management of Chemical Risks,
Chapter 6. Washington, DC, American Chemical Society 1984
Throughout history, regulatory statutes to protect the public health and safety have been worded in sufficiently broad and general terms to authorize the government to utilize current scientific knowledge in determining adequate public protection. The statutory requirements of current health and safety laws implemented by FDA, EPA, CPSC and OSHA are sufficiently flexible to allow the adoption of whatever analytical and decision-making methodology best represents the public interest. Implementation of current regulatory statutes in this field is therefore constrained largely by the current state of scientific knowledge rather than by rigid or obsolete statutory requirements.
EPA Libraries: EJB HQ

****Managing Comprehensive Rule Making: EPA's Plan for Integrated Environment Management**
Schmandt, Jurgen
Univ of Texas at Austin
Public Administration Review (1985). March/April, 309-318
EPA Libraries: EHA R1; EIA R2; EJA R3; EJB HQ; EKA R4; ELA R5; ELB Cinn; EOA R8; ERA R9; ESA R10

****An Overview of Risk-Benefit Analysis in Environmental Law**
Trauberman, Jeffrey
Environmental Law Institute
The Environmental Professional (1981). Vol. 3, p. 217-223
EPA Libraries: EJB HQ

****Patterns in the Laws on Health Risks**
Field, Robert I.
Analysis & Inference Inc. MA.
J Policy Analysis & Management Winter 82, V1, N2, P257 (4)
Technical Feature: Federal risk management techniques designed to identify health, safety, and environmental hazards have proven inconsistent and confusing. A close look at the underlying structure, however, reveals that there is a way to categorize risk statutes and predict future legislative trends and initiates. Congressional desire to control the regulatory process is discussed. (6 References) (ENVL)

****Risk and Benefit in Environmental Law**
Ricci, Paolo F.; Molton, Lawrence, S.
(EPRI) and Science, Dec 4, 81, V214, N4525, P1096(5)

Technical Feature: The treatment in law of several key issues in risk assessment is discussed: The meaning of the 1980 ruling that OSHA must demonstrate that a standard is needed to remedy a significant risk, the burden of proof under conditions of scientific uncertainty, and the resolution of the conflict between the need to reduce hazardous exposures and the desire for accuracy. There exist under current regulatory statutes several paradigms for balancing costs and benefits. (35 references) (ENVL)

****The Risks of Risk Assessment and Risk-Benefit Analysis**
Silverglade, Bruce A.
Food Drug Cosmetic Law Journal (1983) 38: 318-324
EPA Libraries: EIC Edison; EJB HQ

Resolving Environmental Disputes. A Decade of Experience
Bingham, Gail
Washington, DC, The Conservation Foundation, 1986
ISBN: 0-89164-087-8

"...Negotiation, mediation, consensus-building, policy Dialoges -- these and other cooperative measures today are becoming increasingly important in settling environmental disputes. These approaches, first applied in 1974, have resolved scores of conflicts successfully, prompting Dr. Jay Hair, Executive Vice President of the National Wildlife Federation, to predict, 'in ten years, more environmental disputes will be mediated than litigated...mediation is a growth industry.'"

****The Role of the Courts in Risk Management**
Stewart, Richard B.
Environmental Law Reporter 16: Aug 86, 10208-15

****Safety and the Second Best: The Hazards of Public Risk Management in the Courts**
Huber, Peter
Columbia Law Review (1985) 85: 277-337
EPA Libraries: EJB HQ; EJC Law

Some Problems of Risk Balancing for Regulating Environmental Hazards
Gilbert, T.L.
Argonne National Lab., IL
Sponsor: Department of Energy, Washington, DC.
Report No.: CONF-841187-21 1984 16p
DOE environmental protection information meeting,
Albuquerque, NM, 6 Nov 1984
Type Document: Conference Proceeding
Contract No.: W-31-109-ENG-38
DE85004080/XAB

Rational regulation of environmental hazards may be based on the implicit underlying principles that government actions should enhance the average quality of life for those governed and maintain some degree of equity in the distribution of benefits, costs, and risks. Issues arising from these principles have practical implications for risk management policy in general and for the development and application of radiological protection criteria in particular. One of the issues is the appropriate distribution of expenditures for regulating different risks. The total resources available for risk regulation are finite; hence, minimizing the total risk subject to this constraint is an appropriate strategy for optimum risk management. Using a simple model, it is shown that this strategy leads to a distribution of expenditures between different risks such that a greater fraction is allocated to a risk with a higher cost of mitigation or control but the allocation is limited in such a manner that the fractional contribution of that risk to the total risk is also higher. The effect of deviating from this strategy is examined. It is shown that reducing a single risk of concern below the optimum value by a factor 1/F can increase the total risk by about F times the risk of concern. Taking into account the large uncertainties in risk assessment for establishing radiological protection criteria, it is argued that an optimum strategy for remedial action should (1) set basic risk limits as high as reasonable; (2) use realistic, case-specific data and analyses in deriving allowable residual contamination levels from basic risk limits; and (3) implement a policy of reducing residual contamination to levels that are as low as reasonably achievable (ALARA) within the constraints imposed by optimum resource allocation. (10 references) (NTIS)

Toxic Chemicals: The Interface Between Law and Science
Davis, Earon S.; Wilk, Valerie A.
Migrant Legal Action Program, Inc.,
806 Fifteenth Street, NW, Washington, DC 20005. (202)347-5100

An introduction to scientific methods of demonstrating causation of diseases by chemical pollutants and a guide to resources on toxic chemicals. Includes a section on bibliographic and organizational resources in the areas of toxics and the regulatory process, health effects, toxics and the law, epidemiology and biostatistics, risk assessment, directories, catalogues.

****Update: The NEPA Worst Case Analysis Regulation**
Rosenbaum, Kenneth L.
Environmental Law Reporter (1984) 14: 10267-10271

HEALTH RISKS .... *includes occupational and non-occupational management of risks, radiation, risk/benefit, margin of safety, cancer, genetics and public health.*

****Asbestiform Fibers: Nonoccupational Health Risks**
Corporate Source: National Research Council (US).
Committee on Nonoccupational Health Risks of Asbestiform Fibers.
Washington, DC, National Academy Press, 1984
Type Document: Book
Keywords: Asbestos Fibers; Toxicology; Risk Management
EPA Libraries: ESA R10
Call Number: RA1231.A8N38 1984

****Carcinogenic Risk Management in the United States**
Selikoff, Irving J.
CUNY, New York City
Presented at NY Academy of Sciences Annals: Management
of Assessed Risk for Carcinogens Conf, New York City,
Mar 17-19, 80, P283 (11)
Survey Report: The management of carcinogenic risk, both to the general public and in working environments, in the U.S. is reviewed. Various regulatory approaches are discussed. The dose-response approach has been widely used. The end product use method is now being extended to include product use of a carcinogenic agent. Concepts of latency, dose-induction periods, threshold limits, multiple factor interactions, and extrapolation of animal data to humans are also considered. (15 references, 5 tables) (ENVL)

The Dioxins: Public Health Risks
Lowrence, William W.
Prospect Heights, IL, Waveland Press, 1984

****Genetic Control of Environmental Pollutants**
Omenn, Gilbert S., Univ. of Washington;
Alexander Hollaender, Associated Universities, Inc. (eds.)
New York, Plenum, 1986
418p, illustrated, 0-306-416247
Type Document: Series: Basic Life Sciences. Volume 28
Keywords: Genetic Engineering, Management of Toxic
Substances, Potential Environmental Problems
This authoritative, multiauthored volume assesses strategies for the safe and effective management of wastes and toxic substances through the use of genetically engineered

microorganisms. Employing biological, traditional chemical and physical, and combined approaches, leading researchers examine such topics as environmental toxicants, the engineering of organisms to survive, environmental waste streams, and the diverse capabilities of microorganisms. They also look at some potential problems of extending experimental findings to environmental applications.
Source of Abstract: Publisher
EPA Libraries: EJB HQ

****The Limitations of Summary Risk Management Data**
Cothern CR; Schnare, DW
Presented at a symposium entitled "Scientific Praxis in Risk Management" at the annual meeting of the American Association for the Advancement of Science, in Los Angeles, CA, May 29, 1985
Drug Metabolism Reviews 17(1&2), 93-117, 1986
Discussion of the imponderables involved in developing estimates of risk due to contaminants in drinking water and examination of possible science policy options that can be used to deal with these problems.

****Management of Assessed Risk for Carcinogens**
Nicholson, William Jamieson
New York, New York Academy of Sciences, 1981
Type Document: Book
Keywords: Carcinogens; Environmental Health; Public Health Laws
EPA Libraries: EJE OTS; EKB RTP V.363; ELB Cinc. V.363
Call Number: Q11.N5

****Managing Risk in a Technical Society: the Tanner Bill in California**
Mrak EM
Regulatory Toxicology and Pharmacology 5(4): 410-5 Dec 85
Keywords: Air Pollutants/*Toxicity; Animal; Benzene/Toxicity; California; Chemical Industry; Health Education; Human; *Legislation, Drug; Risk; United States Environmental Protection Agency; 71-43-2 (Benzene)
Source: (NLM)

****Margin of Safety as a Risk-Management Concept in Environmental Legislation**
Thompson, Kenneth H.
Center for Policy Research, Wash DC
Columbia J Env Law Fall 79, V6, N1, P1(30)

Survey Report: The Clean Air Act was amended in 1970 to include the requirement that EPA set standards for air pollutants that would allow an adequate margin of safety to protect the public health. The Congressional intent in applying the margin of safety concept to a public health standard is reviewed. The concept is examined in the context of subsequently developed administrative actions, court decisions, and scientific analyses. Results indicate that the margin of safety concept is inadequate for health-risk management because it is inherently vague. A more explicit process of weighing risks and benefits to the public should be employed. (101 references) (ENVL)

****Protecting Public Health**
(EPA risk assessment and risk management efforts; 7 articles)
EPA (Environmental Protection Agency) Journal 10: 2-19 D '84
(PAIS)

Public Health Risks of the Dioxins
Proceedings of a Symposium Held in New York City on
October 19-20, 1983
Lowrence, William W
Life Sciences and Public Policy Program of the Rockefeller University
New York, The University, 1984
Keywords: Toxicology; Dioxins; Environmentally Induced Diseases;
Bibliography; Includes Index
EPA Libraries: EKB RTP
Call Number: RA1242.D55P83

****Risk/Benefit Decisons and the Public Health**
Proceedings of the Third FDA (Office of) Science Symposium,
held at the U.S. Air Force Academy, Colorado Springs, Colorado,
February 15-17, 1978.
Staffa, Jeffrey A
Rockville, MD, DHEW, PHS, FDA, Scientific Liaison staff,
Office of Health Affairs, 1980
Type Document: Series: HEW publication No. (FDA) 80-1069
Keywords: Public Health Administration; Decision Making;
Risk-taking (Psychology); Medical Policy
EPA Libraries: EJE OTS
Call Number: RA427.S985

****Risk by Choice: Regulating Health and Safety in the Workplace**
Viscusi, W. Kip
Cambridge, Mass., Harvard Univ. Press, 1983
Keywords: Industrial Hygiene; Industrial Safety; Industry and State; Bibliography
EPA Libraries: ELB Cinn.
Call Number: HD7654.V57 1983

****Risk Evaluation for Protection of the Public in Radiation Accidents**
Corporate Source: International Atomic Energy Agency. World Health Organization
Vienna, International Atomic Energy Agency, 1967
Type Document: Book
Keywords: Radiation -- Toxicology
EPA Libraries: ERB Las Vegas
Call Number: HD7269.A614 No. 21

****Safety and the Second Best: Hazards of Public Risk Management in the Courts**
Huber, Peter
Columbia Law R 85: 277-337 Mr '85
Tradeoffs involving the "efficient" risk economy, public risk, public health, and private safety and well-being; the courts and the issue of liability. (Tables, chart)
(PAIS)

Standard Setting Standards: A Systematic Approach to Managing Public Health and Safety Risks
Fischhoff, B
Oak Ridge National Lab., TN
Sponsor: Decision Research, Eugene, OR.; Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research; Department of Energy, Washington, DC
Report No.: ORNL/SUB-7576/3
Feb 84 67p
Prepared in cooperation with Decision Research, Eugene, OR
Contract No.: W-7405-ENG-26
NUREG/CR-3508
The present analysis offers a general framework for setting health and safety standards within the nuclear industry and elsewhere. It draws upon a logical analysis of the role of standards in hazard management and upon a historical review of the experience that various government, industry and professional regulatory bodies have had. From these, it derives a set of guidelines regarding when standards should be used, how they can be derived, and what steps are needed to ensure faithful implementation. A separate report (Fischhoff, 1983) applies this framework in an analysis of the nuclear power safety goals, pointing to their various strengths and weaknesses. (NTIS)

ECONOMIC ANALYSIS .... *includes cost/benefit, cost/ effectiveness.*

Benefit-Cost Analysis at EPA
Luken, Ralph A
EPA, Office of Policy, Planning and Evaluation
The Environmental Forum, Oct 1985, p. 42-46
EPA Libraries: EJB HQ

****Costs of Risk Avoidance**
Dewees, Donald N
Univ of Toronto, Canada
Royal Society of Canada/et al. Risk Assessment and Perception Sym,
Toronto, Oct 18-19, 82, p169 (12)

Conference Paper: Two studies of the costs of risk reduction involving occupational or environmental carcinogens are described. A study was conducted under the auspices of the Ontario Royal Commission on Asbestos on the technical feasibility and cost of controlling worker exposure to asbestos fibers. The marginal cost of control varies among work stations within a given plant. Sources of uncertainty in the cost estimates are discussed. The costs of risk reduction were also estimated by the diesel impacts study committee of NAS, which examined the cost of reducing the emission of potentially carcinogenic particulates in the exhaust of diesel automobiles. Uncertainties in future technology developments and in the health effects of such particulates were identified. (2 graphs, 6 references, 4 tables) (ENVL)

****Economic Analysis and Risk Management: An Application to Hazardous Wastes**
(Final rept. Aug 78-Nov 81)
Anderson R; Dower R; Yang E
Environmental Law Inst., Washington, DC
Sponsor: Municipal Environmental Research Lab., Cincinnati, OH
Report No.: EPA-600/2-84-001
Jan 84 244p
Contract No.: EPA-R-805920
PB84-125012

The report evaluates the usefulness of economic analysis in designing effective and efficient hazardous waste regulations. In particular, it examines the applicability of cost/benefit analysis to the specific problems posed by hazardous waste management. The background for the analysis is provided by case studies of regulatory actions on coke oven emissions, saccharin, aflatoxins, and radiation. The report also presents several detailed case studies of past hazardous waste spills. These case studies provided information on how hazardous waste regulations can be analyzed within a cost/benefit framework. The report then selects two specific problems in hazardous waste management to demonstrate qualitatively the application of cost/benefit analysis: uncontrolled dump sites and siting of hazardous waste facilities. It is clear that inadequate data generally will prevent a formal cost/benefit analysis from being undertaken for regulatory programs. However, significant insights can be gained by applying economic analysis to hazardous waste regulations to the extent that available data allow. Such an exercise allows decisionmakers to take a comprehensive and objective view of alternative regulatory policies, revealing cost and benefit relationships and regulatory response priorities. (NTIS)

****RCRA Risk-Cost Analysis Model: Phase III Report**
U. S. Environmental Protection Agency, Office of Solid Waste.
Washington, DC, ICF Inc., 1984
Document Type: Report
Keywords: Risk; Cost-Effectiveness
EPA Libraries: EJB HQ
Call Number: EPAX 8511-0032

****Risk in Benefit-Cost Analysis**
Schulze, William D; Kneese, Allen V
Washington, DC, Resources for the Future, 1981
Document Type: Series
Keywords: Cost-Effectiveness
Notes: Reprinted from Risk Analysis, Volume 1,
Number 1 (March 1981)
EPA Libraries: EKB RTP
Call Number: RFF/R-188

CORPORATE RISK MANAGEMENT

****Corporate Risk Assessment: Strategies and Technologies: How to Limit the Risk in Industry**
Rowe, William D
New York, M. Dekker, 1982
Type Document: Series of Special Reports: Report No. 4
Keywords: Risk Management; Risk
EPA Libraries: EJE OTS
Call Number: HD61.R68

Reducing the Carcinogenic Risks in Industry
Deisler, Paul F, Jr, (Editor)
New York: Marcel Dekker, Inc., 1984. pp. 258

Risk Management in the Chemical and Process Industries
Neumann, PK
C.I.L. Inc., Toronto
Canadian Chemical Engineering 33rd Conference 8340041
Toronto, Ontario, Canada 2-5 Oct 83
Canadian Society for Chemical Engineering (CSChE); Societe Canadienne du Genie Chimique (SCGCh)
1983, Proceedings available: Canadian Society for Chemical Engineering, 151 Slater St., Suite 906, Ottawa, Ontario K1P 5H3, Canada
(CPI)

Risk Management of Existing Chemicals
Chemical Manufacturers Association
Rockville MD: Government Institutes, Inc., 1984
pp. 184

BIBLIOGRAPHIES AND OTHER SOURCES *....this section highlights a variety of documents, including bibliographies, guides, handbooks, and other general reference works which describe management tooks useful in environmental risk management.*

Dynamic Programming. 1976-February, 1984
(Citations from the Management Contents Data Base)
(Rept. for 1976-Feb 84)
National Technical Information Service, Springfield, VA
Apr 84 98p
Document Type: Bibliography
PB84-863638

This bibliography contains citations concerning dynamic programming models and their many applications to risk management, game theory and problem solving-decision analysis. Mathematical programming techniques are discussed relative to the varying degrees of their usage in different segments of American business. Examples of this modern management tool in all facets of corporate business are provided. (Contains 175 citations fully indexed and including a title list.) (NTIS)

****Risk Assessment Techniques: A Handbook for Program Management Personnel**
Information Spectrum, Inc.
Corporate Source: U.S. Dept. of Defense, Fort Belvoir,
Defense Systems Management College
Washington, DC., U.S. Government Printing Office, 1983
Type Document: Book
Keywords: Risk Management; Handbooks; U.S. Dept. of Defense
EPA Libraries: EJA R3; EHA R1 01A0003895

Risk Management Guide
Briscoe, GJ
EG and G Idaho, Inc., Idaho Falls
Sponsor: Energy Research and Development Administration
Jun 77 111p
Contract No.: EY-76-C-07-1507
ERDA-76-45/11

Risk management requires an assessment or a knowledge of risk. This, in turn, requires identification of hazards (sources of risk) and a determination or risk (evaluation of the hazard degree). The hazard identification and risk analysis techniques presented in this Guide are, in general, based on the MORT concept that accidents result from unwanted energy flow in the absence of adequate controls and/or barriers. This Guide presents an analytical tree designed to prevent oversight of specific energy sources in risk identification. Hazard identification by field personnel is also discussed. Quantitative risk analysis is discussed in the following section. A method for summary of the risks for each energy classification is given. This method

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uses a graphical log-normal projection so that low probability events, which are not adequately represented in the experience data, are included in the risk assessment. This permits a more acceptable risk assessment since catastrophes are not ignored, even though the actual risk is only approximated. In addition, a few examples of risk analysis of specific hazards are given. Rudimentary probability and fault tree theory are used in these examples. Total risk assessment and resource allocation and safety performance trend analysis are discussed. (NTIS)

Technological Risk: A Bibliography
Covello, Vincent; Abernathy, Mark
Monticello, IL, Vance Bibliographies, 1983 83p
Type Document: Public Administration Series, P1220
ISBN: 0-88066-550-5
EPA Libraries: EJB HQ

Risk
COMMUNICATION

. . . . THE PROCESS OF EDUCATING AND INFORMING AN AUDIENCE TO MAKE BETTER PERSONAL AND SOCIETAL DECISIONS REGARDING RISK.

Informing the Decision-Maker 177
Informing the Public 179
Informing the Worker 185

Communicating Risk Management Information to Regulators
Brown, RV
Decision Sci. Consortium, Falls Church, VA
Emergency '85--3. Int. Congress and Exhibition for Emergency, Disaster Preparedness and Relief 8525004
Washington, DC 21-24 May 85
For ordering information contact Hazard Monthly, P.O. Box 34408, Bethesda, MD 20817
(CPI)

****A Discussion of Some of the Problems Encountered in Communicating Risk Assessments to Decision Makers**
Cothern, CR; Marcus, WL
U.S. Environmental Protection Agency, Office of Drinking Water (WH-550), Washington, DC
To be published in the proceedings of the annual meeting of the Society for Risk Analysis in Washington, DC, October 1985.
Examination of the general problem areas in discussion between risk assessors and risk managers including language problems and problems in communicating uncertainty and probability. (12 pp)

****The Right to Know About Toxic Exposures. Implications for Physicians**
Himmelstein JS; Frunkin H
N Engl J Med. 1985 Mar 14; 312(11); 687-90
Keywords: Consumer Advocacy/Legislation & Jurisprudence; Environmental Pollutants/*Toxicity; Information Services/ *Standards; *Legislation; Medical; *Occupational Medicine; *Physician's Role; *Role; *Toxicology; United States Occupational Safety and Health Administration

INFORMING THE PUBLIC

An Account of the Management of a Potential Environmental/Medical Crisis by a Local Health Department
Craven, J; Kamen MD
Journal of Community Health 10 (1):3-9, 85

This paper is an account of what steps were necessary in the epidemiological and medical investigation of an alleged cyanide outbreak by a local health department. It details, in chronological sequence, the events, groups, and individuals who impacted a situation which, at various points, caused considerable anxiety in the community.

****Citizen Action for Environmental Health: Report on a Survey of Community Organizations**
Freudenberg, N.
American Journal of Public Health 74(5): 444-8, May 84

A convenience sample of 242 community organizations involved in environmental health issues was surveyed regarding each group's goals, activities, and problems. The 110 groups that replied identified 153 health-threatening hazards including toxic waste dumps, pesticide spraying, and air or water pollution. The most common health conditions which respondents attributed to these hazards were cancer, respiratory problems, birth defects, and reproductive difficulties. The goal identified most frequently was the correction of the specific hazard facing their community. To achieve this aim, groups engaged in a variety of activities including research, public education, demonstrations, lobbying, and legal action. Most groups reported extensive and helpful interactions with scientists or health professionals. Respondents reported problems in obtaining information from local health officials, other government agencies, and industry. A majority of the groups rated their efforts at environmental health protection as being very or somewhat successful. The implications of these findings for local health officials are discussed. (NLM)

****Comments on Informing the Public About the Risks of Ionizing Radiation** (letter)
Tschaeche, AN
Health Physics 48(3): 349-50, Mar 85
Keywords: Communication; Human; Radiation Effects; Risk
(NLM)

****Communicating on Environmental Risk**
Ward, Bud
The Environmental Forum, 1986 Vol. 4, No. 9 (January), p.7
(ENV BIB)

****Communicating Scientific Information About Health and Environmental Risks: Problems and Opportunities from a Social and Behavioral Perspective**

In: Uncertainties in Risk Assessment and Risk Management
Covello, V; Moghissi, A; Uppuluri, VRR
New York, Plenum Press, 1986
Type Document: Chapter in Book
Keywords: Risk Communication; Methods of Communication; Problems in Communicating
Notes: 110 references
EPA Libraries: EJB HQ

****Communicating with the Public on Environmental Risk: Integrating Research and Policy**

Conn, WD; Feimer, Nickolaus R
Virginia Polytechnic Institute and State Univ.
Env. Professional 1985, V7, N1, p39(9)

Journal Article: Research conducted in the fields of psychology and communications is reviewed to assist EPA and other agencies in developing improved ways of communicating risk information to the public. No formula has emerged that an agency can use to allay the fears of anxious citizens faced with environmental risks. Issues warranting further research in aiding public understanding of risk assessment and management are cited. (ENVL)

****Community Relations in Superfund: A Handbook**

(Interim Version) ICF, Inc., Washington, DC
Environmental Protection Agency, Washington, DC
Office of Emergency and Remedial Response
NTIS/PB84-209378, 132p

TD3: This handbook serves as program guidance to EPA Regional Offices and states for conducting community relations activities in the Superfund program. The Superfund community relations program encourages two-way communication between communities affected by releases of hazardous substances and agencies responsible for cleanup actions. The program attempts to provide communities with accurate information about problems posed by releases of hazardous substances; at the same time, it gives local officials and citizens the opportunity to comment on and provide input to technical solutions to site problems. The handbook presents guidelines for developing community relations programs for removal actions and remedial actions. It discusses the advantages and disadvantages of various activities that may be included in a community relations program. The handbook explains the administrative requirements for the program. Guidance on managing community relations activities during enforcement actions will be added to the handbook at a later date. Appendix A discusses how to draft community relations plans and presents examples of community relations plans for removal and remedial actions. Appendix B provides guidance on how to conduct on-site discussions with local officials and citizens and on how to assess community concerns on the basis of these discussions.

****The Costs of Not Testing New Chemicals, or What You Don't Know Can Hurt You**

Choffnes, Eileen
Citizens for a Better Env., Chicago
Presented at Intl. Joint Comm. Hazard Assessment Sym.,
Ann Arbor, Apr 9-11, 79, P201(7)

Technical feature: An explosion occurred at a chemical facility in Chicago Heights, ILL., on August 18, 1978. It resulted in the release of a pesticide to the surrounding community. The public received no information from state and local health or environmental agencies concerning the health effects of exposure to this highly toxic pesticide, EPN. Some people experienced symptoms, such as dizziness and nausea, attributed to prolonged exposure. This incident demonstrates the importance of making toxicity information accessible to the general public. (ENVL)

Decision Making and Risk Management by Individuals: Nitrate-Nitrogen in the Clifton Springs, New York Public Water Supply

(Technical completion rept.)
Bisogni, CA; Lemley, AT; Fessenden-Raden, J
Cornell Univ., Ithaca, NY
Sponsor: Office of Water Research and Technology, Washington, DC
Report No.: W83-04152; OWRT-A-098-NY(1)
Oct 83 13p
Contract No.: DI-14-34-0001-2134; OWRT-A-098-NY
PB84-105501

The public water supply in Clifton Springs, New York has nitrate levels greater than the maximum contaminant level of 10 mg N/liter. The customers have been notified since 1978 by mail, and a Citizens' Advisory Committee was established in 1981 in order to secure public cooperation in solving the problem. A survey project which included a mail questionnaire and indepth interviews in 10% of the village households was instituted to determine the effectiveness of both notification and resident involvement in influencing the public knowledge of their water problem, their concerns about water quality, and their willingness to pay to correct the problem. The results indicate that public participation in decision making is an effective method of educating the community and of securing its cooperation. (NTIS)

****EDB: A Case Study in the Communication of Health Risk**

Sharlin, Harold Issadore
HIS Associates, Washington, DC USEPA Office of Policy Analysis
Washington, DC, Environmental Protection Agency, January 1985
Type document: Report
Keywords: Risk Communication; News Media Reporting;
Problems in Communication
EPA Libraries: EJB HQ

****Explaining Environmental Risk**
Some notes on Environmental Risk Communication
Sandman, Peter M
Rutgers Univ., Cook College
Washington, DC, Environmental Protection Agency,
Office of Toxic Substances, 1986,
46 p. (REFS 15)
Keywords: Communicating with the Media; Communicating
with the Public; Risk Perception

****Flow Reduction: Developing a Public Information Program:**
Final Report
Intasa, Inc.
Corporate Source: EPA Office of Water Program Operations
Springfield, VA, NTIS, 1982
Keywords: Communication in Consumer Education; Water
Conservation; Bibliography
Contract No.: 68-01-6052
PB83-150508
EPA Libraries: EJB HQ
Call Number: EPAX 8603-0145

****Grassroots Environmentalism Under Attack: Dandelions,**
Pesticides, and a Neighbor's Right-to-know.
Christoffel, T.
Am J Public Health 1985 May; 75(5):565-7
Keywords: *Environmental Pollutants; Human; Illinois;
*Legislation; *Pesticides; United States
(NLM)

***Informing People About Risk**
Slovic, Paul; Fischhoff, Baruch; Lichtenstein, Sarah
In: Product Labeling and Health Risks. Banbury Report 6
Morris, L; Mazis, M.; Barofsky, B. (eds)
Cold Spring Harbor, NY 1980 p165-181
EPA Libraries: EJE OTS
Call Number: RA422.P75

Labeling in Hazard Communication
Hall, SK
189th ACS National Meeting, Miami, FL 28 Apr-3 May 85
American Chemical Society (ACS)
Abstracts available. Contact the American Chemical Society Distribution,
Room 210, 1155 16th St., NW, Washington, DC 20036

***A Nonadvocate Model for Health Risk Communications**
Petcovic, WL; Johnson, RH
30th Annual Meeting of the Health Physics Society, Chicago ILL, May 26-31, 1985
Health Physics 49(1) 1985. 166p
Keywords: Radiation Risk; Politics; Society
(NLM)

****Risk Communication. We Must Talk About Risk**
Thomas, Lee M
Environment 1986 Vol. 28, No. 2 (March) p4
(ENV Bib)

****Risk In a Free Society**
Ruckelshaus, William D
EPA Administrator
ENV Law Reporter May 84, V14, N5, p10190(5)

Journal article: Problems encountered by EPA in regulating public exposures to chemical residues and products are considered. Difficulties inherent in separating risk assessment from risk management are cited. Uncertainties about exposure and in extrapolating cancer data from laboratory animals to humans further constrain the regulatory process. Factors influencing public response to risk are surveyed, and the need to implement community and public education programs is stressed. (ENVL)

San Diego County's Community Right-to-know Ordinance: Case Study of a Local Approach to Hazardous Substances Control
Guidotti, TL
J Public Health Policy 1984 Sep;5(3):396-409
Keywords: Industrial Waste; Adverse Effects; *Prevention and Control; *Legislation; Public Health; *Truth Disclosure; California
(NLM)

****Science in the Streets**
Nelkin, Dorothy; Schwartz, Henry
Twentieth Century Fund. Task Force on the Communication of Scientific Risk
New York, Priority Press, 1984
Document Type: Report
Keywords: Technology Assessment; Communication of Technical Information
EPA Libraries: ELB HQ
Call Number: T174.5.T8 1984

The Smokeless Tobacco Industry's Failure to Warn. A Case for the Courts
Ellington, D
J Leg Med (Chicago) 1985 Dec;6(4):489-507
Keywords: Consumer Advocacy; *Legislation and Jurisprudence; Human; *Tobacco; *Tobacco, Smokeless; United States
(NLM)

Toxic Chemical Information Systems and Right-to-Know
Cole, HS
Public Health Policy 1986 Spring; 7(1):28-36
Keywords: Accidents; Occupational; Civil Rights/*Legislation and Jurisprudence; Environmental Monitoring; Environmental Pollutants/*Adverse Effects; Human; *Information Systems; New Jersey; Risk; Truth Disclosure; United States Occupational Safety and Health Administration; United States
(NLM)

****Why We Must Talk About Risk: A Personal View**
Thomas, Lee M
USEPA
Paper presented at the National Conference on Risk Assessment, Washington, D.C., January 30, 1986
EPA Libraries: EJB HQ

INFORMING THE WORKER

Chemical Industry Accidents, Liability, and Community Right-to-Know
Baram, MS
Am J Public Health 1986 May; 76(5):568-72
Keywords: Accidents; *Chemical Industry; Consumer Advocacy/ *Legislation and Jurisprudence; Environmental Pollutants/ *Poisoning; Europe; Human; Risk Support, U.S. Gov't, Non-P.H.S.; United States Environmental Protection Agency; United States

****Complying with Right-to-Know is a State Versus Federal Problem**
Fox, LA
Occup Health Saf 1986 Apr;55(4):36-40
Keywords: Civil Rights/*Legislation & Jurisprudence; Consumer Product Safety; *Environmental Exposure; Human; Industry; *Occupational Medicine; Product Labeling/methods; State Government; United States Occupational Safety and Health Administration; United States

Complying with Workers' Right-to-Know Legislation
Knoeck, MJ Jr; Wadd, WS; Giese, RM
Am J Hosp Pharm 1985 Sep;42(9):1974-6

The development of a manual of drug monographs about the handling of antineoplastic agents that complies with the Minnesota Right-to-Know Act is described. The Occupational Safety and Health Administration (OSHA) regulations require manufacturers to provide employees with information about dangerous substances they handle as part of their jobs. OSHA regulations exclude the health-care job sector and drugs, but many states have passed workers' right-to-know acts that include pharmacies. Under the Minnesota Workers' Right-to-Know Act, many antineoplastic drugs are classified as hazardous substances. The Minnesota law applies to all employers, who must provide information and training to all employees who handle these agents. At Midway Hospital in St. Paul, a manual containing information about antineoplastic drugs was developed by the pharmacy department to comply with Minnesota law. The drug monographs were written by pharmacy personnel using information received from drug companies and published articles. The manual was used to teach technicians as well as members of the oncology-unit nursing staff and nursing personnel at a nearby clinic about handling antineoplastic agents. Pharmacy directors in states with right-to-know laws must determine whether the health-care job sector and drugs are covered and, if so, implement policies to teach employees about the handling of these toxic agents.

****Despite Preemption Threat Local Right-to-Know Laws Increase**
McElveen, JC Jr.
Occup Health Saf 1985 Jan;54(1):20-6
Keywords: *Chemical Industry; Environmental Exposure; Human; *Legislation; Maximum Permissible Exposure Level; Product Labeling; *Truth Disclosure; United States; *United States Occupational Safety and Health Administration

****Effective Management of Safety and Hygiene Information to Promote Safe Handling of Chemicals**
Carron PA; Jones K
Journal of Hazardous Materials 9(3):305-314;1984

HMTC Efficient management of safety and hygiene information is necessary to ensure safe handling of chemicals. The legal obligations of suppliers of hazardous substances to their employees, customers, and community are addressed. Factors affecting the application of safety and hygiene information to reduce risk such as the quality of the information and the effectiveness of communication of the data are included. Data management methods using computers in different kinds of organizational structures are outlined. (40 ref.)

Final Regulatory Impact and Regulatory Flexibility Analyses of the Hazard Communication Standard
Occupational Safety and Health Administration, Washington, DC
Report No.: OSHA/IS-83/1027
9 Aug 83 289p
PB84-132984

This regulatory impact analysis evaluates the cost-effectiveness of OSHA's November 1983 standard on hazard communication. The current standard is largely performance-oriented and focuses on communicating information on chemical hazards in the workplace. The standard results in initial compliance costs of approximately $604 million or $43 per employee. The annual cost is $159 million or only $11 per employee. The costs of the standard are also compared to the expected costs of state and local regulations and other considered federal regulatory actions. The benefits of the proposed standard are measured as the discounted present value of (1) reductions in lost earnings and medical expenses for various categories of chemical source illnesses and injuries, (2) lowered turnover costs, and (3) property losses from chemical fires. (NTIS)

****Handbook of Hazard Communication and OSHA Requirements**
Lowry GG; Lowry RC
1985, 145 pp

CBAC COPYRIGHT: CHEM ABS: Book, hazard communication requirement; Health hazard Communication in relation to, Occupational Safety and Health Agency requirements

The New OSHA Rules and the Worker's Right-to-Know

McGarity TO

Hastings Cent Rep 1984 Aug;14(4):38-45

Keywords: *Accident Prevention; Civil Rights/Legislation and Jurisprudence; Informed Consent/Legislation and Jurisprudence; Occupational Diseases/*Prevention and Control; Occupational Medicine; *Safety; Support; U.S. Gov't; Non-P.H.S.; *Truth Disclosure; United States; Workmen's Compensation/Legislation & Jurisprudence

OSHA's Hazard Communication Standard Requirements of Employee Right to Know Law

Sevigny MN

Qual. Assur. Manager, Orion Res. Inc., Cambridge, MA

1985 Pittsburgh Conference and Exhibition on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA 25 Feb-1 Mar 1985

No ordering information available at the present time.

Abstract No. 921

(CPI)

****Psychology in Health Risk Messages for Workers**

Cohen A; Colligan MJ; Berger P

Applied Psychology and Ergonomics Branch, National Institute for Occupational Safety and Health, Cincinnati, OH 45226

J Occup Med Vol 27, ISS 8, 1985, p543-51

The content, style, and mode of company communications directed to workers regarding job hazards and health risks are frequently based only on concerns for technical accuracy and legal liability. These considerations as shaping factors in informational messages do not ensure worker understanding and responsiveness. Moreover, the uncertainty of health threats posed by many workplace chemical and physical agents, and the delayed, insidious disorders they may portend, present formidable obstacles in this regard. This report describes guidelines that attempt to overcome these difficulties, with specific reference to printed forms of informational material. The guidelines are based on concepts from the cognitive and social psychology literature, with additional input from experts in those fields as well as representatives from management and labor who have responsibilities for worker health education in their respective organizations. Selected guidelines are presented and critiques are offered of samples of hazard information materials directed to workers in light of the guidelines' prescriptions. Field trials are planned as a follow-up.

The Right to Know About Hazardous Chemicals: Local Government Responsibilities
Jeffress, Charles
Popular Govt 51:36-40+ Winter '86
North Carolina
Adoption of the Occupational Safety and Health Act standard on hazard communication and the Hazardous Chemical Right to Know Act. (PAIS)

****Right to Know and the Duty to Disclose Hazard Information**
Baram, MS
Boston Univ. School of Public Health, MA
Am. J. Public Health Nation's Health
74:4. Apr 1984 385-390 p.
Since 1970, OSHA has used its authority to regulate various health and safety hazards in private workplaces. Two types of OSHA regulations establish rights to know and duties to disclose: rules dealing with specific substances, and generic access to information rules. OSHA rules for specific hazards such as coke oven emissions, asbestos, arsenic, acrylonitrile, cotton dust, noise, and lead each contain separate requirements for record compilation, reporting, and worker access. Generic rights of access and duties to disclose are afforded by three OSHA rules: the rule on inspections under the general duty clause of the enabling statute, the access to medical and exposue records rule, and the new hazard communication rule. Under the general duty clause and OSHA regulation, workers have the right to request OSHA inspection, and to be notified of any imminent dangers of death or serious physical harm discovered by the inspector. The effectiveness of this rule is dependent on worker initiative. OSHA inspection, and the extent to which proprietary claims limit disclosures. It is usually invoked after some exposure has occurred, and thus has a somewhat limited role in risk prevention. Legal and historical aspects of these regulations are discussed in detail in this review. (REFS 38) Presentation, intensity and distribution of risk communications are prescribed. (82 references, 2 figures, 1 table) (DOE)

Right-to-Know: Implications of New Jersey's Law
Koplin, AN
J Public Health Policy 1984 Dec;5(4):538-49
Keywords: *Environmental Exposure; Health Policy/ *Legislation & Jurisprudence; Human Rights/*Legislation & Jurisprudence; New Jersey; Occupational Diseases/*Prevention & Control; Safety

Right-to-Know Laws and Evaluation of Toxicologic Data
Bunn, WB
Ann Intern Med 1985 Dec;103(6 [Pt 1]):947-9
Keywords: Environmental Pollutants/*Adverse Effects; Human Rights/*Legislation & Jurisprudence; Occupational Diseases/Chemically Induced/*Prevention & Control; Physician's Role; Risk; Toxicology; *Truth Disclosure

****The "Right to Know": Toxics Information Transfer in the Workplace**

Ashford NA; Caldart CC

Annu Rev Public Health 1985; 6:383-401

Keywords: Confidentiality/Legislation & Jurisprudence; Environmental Exposure; Human Rights/Legislation & Jurisprudence; Occupational Diseases/*Chemically Induced; Risk; *Truth Disclosure; United States; United States Occupational Safety and Health Administration

The Workers Right-to-Know: Obstacles, Ambiguities and Loopholes

Richter, ED

Hebrew University-Hadassah Medical School, Jerusalem, Israel

J Health Polit Policy Law 6(2) 1981 339-349

HEEP COPYRIGHT: BIOL ABS. Telling the worker about exposure to occupational hazards and their potentially adverse health effects has been established as an ethical principle of occupational health and safety. Situations or issues that may result in incomplete application or nonapplication of this principle include: the employee's need to initiate the disclosure process, medical reluctance to disclose exposure data, long latency periods between exposure and effect, problems of quality control, the use of monitoring methods with low predictive value, statutory secrecy provisions, doctor-patient communication difficulties, serious social and health problems not related to work environment, the nonspecific nature of most work-related morbidity and the absence of any monitoring. Obligatory disclosure of exposure information is hypothesized to spur preventive measures, environmental and personal, for short- and long-term hazards. Where the foregoing problems interfere with full disclosure, this norm's full preventive role may not be fulfilled. Evaluation of the effect of disclosure requirements on promoting occupational health and safety must include attention to this possibility.

Other Sources

ORGANIZATIONS
MEETINGS AND CONFERENCES
EDUCATION

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ORGANIZATIONS

Organizations are excellent sources of information about research-in-progress, current developments, expert contacts, publications, sponsored meetings, and information related to your particular interests. The following are some of the organizations involved in influencing policy, supporting research, and advancing current thinking on risk.

1. **AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)**
Department of Health and Human Services
Public Health Service
1600 Clifton Road NE
Atlanta, Georgia 30333
404/452-4113

The ATSDR was established by section 104(i) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (94 stat. 2767; 42 U.S.C. 9601 note).

The ATSDR in cooperation with State and other Federal and local official agencies, collects, maintains, analyzes, and disseminates information relating to serious diseases and mortality and information relating to human exposure to toxic or hazardous substances; establishes appropriate registries necessary for long-term followup or specific scientific studies are some of its many functions.

2. **AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE**
1333 H Street, N.W.
Washington, D.C. 20005
202/467-4400

This is the largest general scientific organization representing all fields of science. Publications and meetings feature risk assessment, management, and communication within the scientific sections.

Annual Meeting.
Publications: Abstracts of annual meeting.
  Selected meeting symposia are published by:
    Westview Press
    5500 Central Avenue
    Boulder, Colorado 80301
    303/444-3541
  Audiotapes of selected sessions are published by:
    Mobile Tapes
    1741 Gardena Avenue
    Glendale, California 91204
    818/244-8122

  Science (weekly).

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3. **ENVIRONMENTAL PROTECTION AGENCY RISK ASSESSMENT COUNCIL**
US EPA
401 M Street, S.W.
PM-220
Washington, D.C. 20460

Contact: Daniel P. Beardsley
202/382-2747

Chairman: John A. Moore
202/382-2902

Provides executive oversight of the development, review, and implementation of risk assessment policy at EPA.

4. **ENVIRONMENTAL PROTECTION AGENCY RISK ASSESSMENT FORUM**
US EPA
401 M Street, S.W.
PM-220
Washington, D.C. 20460

Publications: Risk Assessment Forum Series

Chairman: Peter Preuss
202/382-7960

5. **ENVIRONMENTAL PROTECTION AGENCY RISK MANAGEMENT COUNCIL**
US EPA
401 M Street, S.W.
PM-220
Washington, D.C. 20460

Contact: Deborah Taylor
202/382-7960

6. **NATIONAL SCIENCE FOUNDATION**
Directorate for Biological, Behavioral and Social Sciences
Social and Economic Science Division
1800 G Street, N.W.
Washington, D.C. 20550

Supports basic and applied research and education in the sciences. NSF reports and books on risk are published by:

Plenum Publishing Corp.
233 Spring Street
New York, N. Y. 10013
212/620-8000

Contact: Dr. Vincent T. Covello - Risk Assessment
202/357-7417

7. **RESOURCES FOR THE FUTURE, INC.**
1616 P Street, N.W.
Washington, D.C. 20036

"... advances research and public education in the development, conservation, and use of natural resources and in the quality of the environment." Other areas of research include risk assessment, management, and communication. Proposed "Center for Risk Management" under development by William Ruckelshaus.

Publications: Research results are published in 16 subject areas. Catalog available at above address or 202/328-5086.

Contact: Dr. Paul Portney, Director
Quality of the Environment Division
202/328-5055

8. **SOCIETY FOR RISK ANALYSIS**
1340 Old Chain Bridge Road
Suite 300
McLean, Virginia 22101
703/790-1745

Risk assessment professionals from varied disciplines conduct studies to understand on a scientific basis the risks posed by technological developments.

Annual Meeting.
Proceedings of the annual meeting are published by:
Plenum Publishing Corp. (address above)

Publications: Newsletter (quarterly)
Risk Analysis (quarterly)

MEETINGS AND CONFERENCES ON ENVIRONMENTAL RISK

Meetings and conferences are unique opportunities for information exchange and identifying experts and contacts in special areas of interest. Even if one cannot directly participate, the program announcements, abstracts and proceedings which result can be valuable sources of information on current thinking, research and trends. Advance notice of meetings and conferences are announced in the What's New in the EPA Library. Several sponsors of major meetings and conferences are listed and can be contacted for further information.

1. **American Association for the Advancement of Science (AAAS). Annual Meeting.**

Sponsor: AAAS
1333 H Street, N.W.
Washington, D.C. 20005
202/467-4400

2. **Biotechnology Policy and Regulation - Conference**

Sponsors: Inside EPA Weekly Report
P.O.BOX 7167
Ben Franklin Station
Washington, D.C. 20044
800/424-9068

The Center for Energy and Environmental Management
11726 Winterway Ln.
Fairfax Station, Virginia
703/250-5900

3. **Risk Assessment - Conference**

Sponsor: The Center for Energy and Environmental Management
11726 Winterway Ln.
Fairfax Station, Virginia
703/250-5900

4. **Risk Assessment/Risk Management - Conference**

Sponsor: American Bar Association
1800 M Street, N.W.
Washington, D.C.
202/331-2276

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5. **Risk Management - Conference**

Sponsor: New York Univ. Graduate School of Public Administration.
212/598-3725

6. **Society for Risk Analysis**
Annual Meeting.

Sponsor: Society for Risk Analysis
1340 Old Chain Bridge Road
Suite 300
McLean, Virginia
703/328-5055

7. **Washington Conference on Risk Assessment.**
Annual Meeting.

Sponsors: Inside EPA Weekly Report
P.O.Box 7167
Ben Franklin Station
Washington, D.C. 20044
800/424-9068
703/892-8500

The Center for Energy and Environmental Management.
11726 Winterway Ln.
Fairfax Station, Virginia
703/250-5900

8. **Workshop on Pragmatics of Risk Assessment**

Sponsor: Society of Toxicology
1133 15th Street, N.W.
Washington, D.C. 20005
202/429-9440

EDUCATION

There is a growing demand for fuller understanding of the issues, processes, and techniques of risk assessment, management, and communication. Training in principles and fundamentals of risk is responding to the need for better informed professionals. Several educational opportunities are identified for the prospective participant to pursue. Educational opportunities will be announced in the EPA Headquarters Library What's New in the EPA Library.

1. Carcinogen Risk Analysis - Course

Description: "Risk analysis in occupational health with emphasis on carcinogenesis."

Sponsor: Harvard School of Public Health
Office of Continuing Education
677 Huntington Avenue
Boston, Ma. 02115
617/732-1171

2. Environmental Risk Management - Seminar

Description: Designed to provide "managerial and decisionmaking skills for public and private sector managers and specialists in environmental health, emergency services and regulation relating to hazardous and toxic substances."

Sponsor: New York University
Graduate School of Public Administration
212/598-3725

3. Risk Assessment

Description: "Provides a streamlined, systematic survey of the science of risk assessment by outlining the basic information and methods used in the risk assessment process. It concludes with a workshop in which participants work through a hypothetical environmental problem."

Sponsor: EPA Institute
Michael E. O'Reilly, Director
EPA HQ - 401 M Street, SW
PM-224
E-Mail EPA3880
Washington, DC 20460
FTS 8/382-2594

4. **Survey of Toxicologic Risk Assessment Methodologies.**
Course Number: TOXI 517M
Instructor: Dr. Jerry L.R. Chandler
U.S. Food and Drug Administration

Description: "Quantitative risk assessments are emerging as a critical component of toxicological evaluations of chemical agents. This survey course will develop the risk assessment models from fundamental scientific concepts. The essential mathematical background ... Commonly used linear and nonlinear models will be analyzed. The biochemical and biological principles linking the mathematical assumptions to the mechanisms will be analyzed...Application of the models to carcinogenic, mutagenic, and other toxic effects will be emphasized with recent examples of public concern. The interaction between the degree of scientific uncertainty, ethics, values, and legal evidentiary principles will be discussed."

Sponsor: National Institutes of Health
Foundation for Advanced Education in the Sciences, Inc.
Building 10, Room B1-L-101
Bethesda, Maryland 20205
310/496-7976

5. **Toxicology for Attorneys**

Course Directors: Dr. Gary L. Lage & David B. Brushwood
215/596-8830 215/596-8947
Philadelphia College of Pharmacy & Science
Philadelphia, Pa. 19104

Appendix A

REGIONAL NETWORK
FOR
RISK ASSESSMENT/
RISK MANAGEMENT
ISSUES

APPENDIX A

EPA REGIONAL NETWORK FOR RISK ASSESSMENT/RISK MANAGEMENT ISSUES

REGION	SENIOR CONTACT	STAFF	OTHER MEMBERSHIPS
I	Paul Keough Deputy Regional Admin. J.F. Kennedy Federal Bldg. Room 2203 Boston, MA 02203 (FTS) 835-3402 E-Mail EPA9102	Tom D'Avanzo, Chair Toxics Coordinating Comm. (FTS) 835-3222 E-Mail EPA9136	Barbara Beck[1] Toxicologist Air Management Div. Harley Laing[5] Director Planning & Mgmt. Div.
II	Alice Jenik, Acting Chief Policy & Program Integration Branch 26 Federal Plaza New York, NY 10278 (FTS) 264-4296 E-Mail EPA9243	Maria Pavlova Office of Emergency & Remedial Response (FTS) 264-1918 E-Mail EPA9231	Bill Muzynski[2] Deputy Regional Administrator
III	Greene Jones, Director Environmental Services Div. 841 Chestnut Bldg. Philadelphia, PA 19107 (FTS) 597-4532 E-Mail EPA9380	Roy Smith Environmental Scientist Environmental Serv. Div. (FTS) 597-9857 E-Mail EPA9381	Stan Laskowski[3] Deputy Regional Administrator Steve Wassersug[2] Director, Hazardous Waste Management
IV	Lee DeHihns[3,4] Deputy Reg. Admin. 345 Courtland St., NE Atlanta, GA 30365 (FTS) 257-4727 E-Mail EPA9400	Susan Deihl Risk Assessment Coordinator Office of the Regional Administrator (FTS) 256-3776 E-Mail EPA9400	
V	Bill Sanders, Director Environmental Services Div. 230 South Dearborn St. Chicago, IL 60604 (FTS) 353-3808 E-Mail EPA9580	David Dolan (5S-PTSB-7) Environmental Scientist Pesticides & Toxic Substances Branch (FTS) 886-5518 E-Mail EPA9575 Milt Clark (5HT) Chairman, Health Effects Forum Pesticides & Toxic Substances Branch (FTS) 886-3388 E-Mail EPA9575	

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Air Programs Branch
(FTS) 729-9187
E-Mail EPA9661

Frances Phillips[4]
Acting Regional
Administrator

VII
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Deputy Region. Admin.
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Kansas City, KA 66101
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E-Mail EPA9703

Bob Fenemore
Air & Toxics Div.
(FTS) 757-2835
E-Mail EPA9761

Art Spratlin[5]
Director
Air & Toxics Div.

VIII
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E-Mail EPA9802

Jim Baker
Waste Management Div.
(FTS) 564-1518
E-mAIL epa9873

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X
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E-Mail EPA9021

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(FTS) 399-1597
E-Mail EPA9051

[1] Risk Assessment Forum
[2] Risk Advisory Council
[3] Risk Management Council
[4] ATSDR Task Force
[5] Comparative Risk Task Force

Appendix B

EPA
LIBRARIES

APPENDIX B

EPA LIBRARIES

Federal, State, Academic and special library collections contain various works cited here. EPA personnel should consult the nearest library in the EPA network. Following the entry for the EPA Headquarters Library, the Network libraries are listed by EPA Region.

1. **HEADQUARTERS LIBRARY, WASHINGTON, DC**
Code: EJB

Address: U.S. Environmental Protection Agency
Headquarters Library, PM-211A
401 M Street, SW., Room 2904 WSM
Washington, DC 20460

Telephone: (202) 382-5921 (CML)
(8) 382-5921 (FTS)

Librarian: Emma McNamara

2. **REGION 1, BOSTON, MASSACHUSETTS**
Code: EHA

Address: U.S. EPA Region 1 Library
JFK Federal Building
Boston, MA 02203

Telephone: (617) 223-4017 or 5791 (CML)
(8) 223-4017 or 5791 (FTS)

Librarian: Peg Nelson

3. **NARRAGANSETT, RHODE ISLAND**
Code: EHB

Address: U.S. Environmental Protection Agency
Environmental Research Laboratory Library
South Ferry Road
Narragansett, RI 02882

Telephone: (401) 789-1071 (CML)
(8) 838-5087 (FTS)

Librarian: Rose Ann Gamache

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4. **REGION 2, NEW YORK, NEW YORK**
Code: EIA

Address: U.S. Environmental Protection Agency
Region 2 Library
26 Federal Plaza
New York, NY 10278

Telephone: (212) 264-2881 (CML)
(8) 264-2881 (FTS)

Librarian: Dennis Carey

5. **EDISON, NEW JERSEY**
Code: EIC

Address: U.S. Environmental Protection Agency
Region 2 Field Office Library
Edison, NJ 08837

Telephone: (201) 321-6762 (CML)
(8) 340-6762 (FTS)

Librarian: Dorothy Szefczyk

6. **REGION 3, PHILADELPHIA**
Code: EJA

Address: U.S. Environmental Protection Agency
Region 3 Library (3PM21)
841 Chestnut Street
Philadelphia, PA 19107

Telephone: (215) 597-0580 (CML)
(8) 597-0580 (FTS)

Librarian: Diane McCreary

7. **LAW LIBRARY, WASHINGTON, DC**
Code: EJC

Address: U. S. Environmental Protection Agency
Law Library, LE-130L
401 M Street, SW., Room 2902
Washington, DC 20460

Telephone: (202) 382-5919 (CML)
(8) 382-5919 (FTS)

Librarian: Barbara Pedrini Morrison

8. **ANNAPOLIS ,MARYLAND**
Code: EJD

Address: U.S. Environmental Protection Agency
Central Regional Laboratory (CRL) Library
839 Bestgate Road
Annapolis, MD 21401

Telephone: (301) 224-2740 (CML)
(8) 922-3752 (FTS)

Librarian: Meg Munro

9. **NON-CONFIDENTIAL INFORMATION CENTER, WASHINGTON, DC**
Code: EJE

Address: U.S. Environmental Protection Agency
Office of Toxic Substances
NCIC, TS-793
401 M Street, SW.
Washington, DC 20460

Telephone: (202) 382-3529 (CML)
(8) 382-3529 (FTS)

Librarian: Doug Sellars

10. REGION 4, ATLANTA, GEORGIA

Code: EKA

Address: U.S. Environmental Protection Agency
Region 4 Library (G6)
345 Courtland Street, NE.
Atlanta, GA 30365-2401

Telephone: (404) 347-4216 (CML)
(8) 257-4216 (FTS)

Librarian: Gayle Alston

11. LIBRARY SERVICES OFFICE, RESEARCH TRIANGLE PARK, NORTH CAROLINA

Code: EKB

Address: U.S. Environmental Protection Agency
Library Services Office, MD-35
Research Triangle Park, NC 27711

Telephone: (919) 541-2777 (CML)
(8) 629-2777 (FTS)

Librarian: Libby Smith

12. GULF BREEZE, FLORIDA

Code: EKC

Address: U.S. Environmental Protection Agency
Environmental Research Laboratory (ERL) Library
Sabine Island
Gulf Breeze, FL 32561

Telephone: (904) 932-5311, ext. 218 (CML)
(8) 686-9011, ext. 218 (FTS)

Librarian: Susan Means

13. ATHENS, GEORGIA
Code: EKD

Address: U.S. Environmental Protection Agency
Environmental Research Laboratory Library
College Station Road
Athens, GA 30613

Telephone: (404) 546-3324 (CML)
(8) 250-3324 (FTS)

Librarian: Janice Sims

14. OAQPS,RESEARCH TRIANGLE PARK, NORTH CAROLINA
Code: EKE

Address: U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
826 Mutual Plaza, MD-16
Research Triangle Park, NC 27711

Telephone: (919) 541-5514 (CML)
(8) 629-5514 (FTS)

Librarian: University of North Carolina Library School
Graduate Student

15. ASRL-METEOROLOGY, RESEARCH TRIANGLE PARK, NORTH CAROLINA
Code: EKF

Address: U.S. Environmental Protection Agency
ASRL - Meteorology Division
Library (MD-80)
Research Triangle Park, NC 27711

Telephone: (919) 541-4536 (CML)
(8) 629-4536 (FTS)

Librarian: Evelyn Poole-Kober

16. **REGION 5, CHICAGO**
Code: ELA

Address: U.S. Environmental Protection Agency
Region 5 Library
230 South Dearborn Street., Room 1670
Chicago, IL 60604

Telephone: (312) 353-2022 (CML)
(8) 353-2022 (FTS)

Librarian: Lou W. Tilley

17. **CINCINNATI, OHIO**
Code: ELB

Address: U.S. Environmental Protection Agency
Andrew W. Briedenbach Environmental Research
Center Library
26 W. St. Clair Street
Cincinnati, OH 45268

Telephone: (513) 569-7707 (CML)
(8) 684-7707 (FTS)

Librarian: Jonda Byrd

18. **ANN ARBOR, MICHIGAN**
Code: ELC

Address: U.S. Environmental Protection Agency
Motor Vehicle Emission Laboratory
Library
2565 Plymouth Road
Ann Arbor, MI 48105

Telephone: (313) 668-4311 (CML)
(8) 374-8311 (FTS)

Librarian: Debra Talsma

19. **DULUTH, MINNESOTA**
Code: ELD

Address: U.S. Environmental Protection Agency
Environmental Research Laboratory
Library
6201 Congdon Boulevard
Duluth, MN 55804

Telephone: (218) 720-5538 (CML)
(8) 780-5538 (FTS)

Librarian: Mary Harden

20. **REGION 6, DALLAS, TEXAS**
Code: EMA

Address: U.S. Environmental Protection Agency
Region 6 Information Center
1201 Elm Street
First International Building
Dallas, TX 75270

Telephone: (214) 767-7341 (CML)
(8) 729-7341 (FTS)

Information Center Coordinator: Nita House

21. **ADA, OKLAHOMA**
Code: EMB

Address: U.S. Environmental Protection Agency
Robert S. Kerr Environmental Research
Laboratory Library
P.O. Box 1198
Ada, OK 74820

Telephone: (405) 332-8800 (CML)
(8) 743-2241 (FTS)

Librarian: Stanley Shannon

22. **REGION 7, KANSAS CITY, KANSAS**
Code: ENA

Address: U.S. Environmental Protection Agency
Region 7 Library
726 Minnesota Avenue
Kansas City, KS 66101

Telephone: (913) 236-2828 (CML)
(8) 757-2828 (FTS)

Librarian: Constance McKenzie

23. **REGION 8, DENVER, COLORADO**
Code: EOA

Address: U.S. Environmental Protection Agency
Region 8 Library, 8PM-IML
999 18th Street, Suite 1300
Denver, CO 80202-2413

Telephone: (303) 293-1444 (CML)
(8) 564-1444 (FTS)

Librarian: Dolores Eddy

24. **DENVER, COLORADO**
Code: EOB

Address: U.S. Environmental Protection Agency
National Enforcement Investigations Center Library
Building 53, Box 25227
Denver Federal Center
Denver, CO 80225

Telephone: (303) 236-3219 (CML)
(8) 776-3219 (FTS)

Librarian: Dorothy Biggs

25. **REGION 9, SAN FRANCISCO, CALIFORNIA**
Code: ERA

Address: U.S. Environmental Protection Agency
Region 9 Library
215 Fremont Street, 6th Floor
San Francisco, CA 94105

Telephone: (415) 974-8082 (CML)
(8) 454-8082 (FTS)

Librarian: Marsha Saylor

26. **LAS VEGAS, NEVADA**
Code: ERB

Address: U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory Library
944 E. Harmon Avenue
(P.O. Box 15027, Zip 89114)
Las Vegas, NV 89109

Telephone: (702) 798-2648 - 2646 (CML)
(8) 545-2648 - 2646 (FTS)

Librarian: Doreen Wickman

27. **REGION 10, SEATTLE, WASHINGTON**
Code: ESA

Address: U.S. Environmental Protection Agency
Region 10 Library
1200 Sixth Avenue
Seattle, WA 98101

Telephone: (206) 442-1289 or 1259 (CML)
(8) 399-1289 or 1259 (FTS)

Librarian: Julienne Sears

28. CORVALLIS, OREGON

Code: ESB

Address: U.S. Environmental Protection Agency
Corvallis Environmental Research Laboratory Library
200 SW 35th Street
Corvallis, OR 97333

Telephone: (503) 757-4731 (CML)
(8) 420-4731 (FTS)

Librarian: Betty M. McCauley

Appendix C

COMMERCIAL
DATABASES
SEARCHED

APPENDIX C

DATABASES SEARCHED

The following commercial databases and period of time were searched in preparing this Guide:

National Library of Medicine
U.S. Dept. of Health and Human Services
Bethesda, Maryland 20209
Phone: 301/496-6193

File Name	Code in Guide	Coverage	File #
Toxline	(NLM)	1981 - Sep 1986	--

(MEDLINE and CANCERLIT were also searched but duplicated many of the relevant references selected for this bibliography).

Dialog Information Services, Inc.
Palo Alto, California 14304
Phone: 800-227-1960
800-982-5838 (in California)

File Name	Code in Guide	Coverage	File #
Compendex	(Comp)	1970 - Sep 1986	File 8
Conference Papers Index	(CPI)	1973 - Apr 1986	File 77
DOE Energy	(DOE)	1983 - May 1986	File 103
EI Engineering Meetings	(EI)	1979 - Sep 1986	File 165
Enviroline	(ENVL)	1970 - Apr 1986	File 40
Environmental Bibliography	(ENV BIB)	1973 - Sep 1986	File 68
GPO Monthly Catalog	(GPO)	Jul 1976 - Aug 1986	File 66
NTIS	(NTIS)	1964 - Sep 1986	File 6
PAIS International [Public Affairs Info Service]	(PAIS)	1976 - Aug 1986	File 49

The EPA Information Systems Inventory (ISI) contains descriptions of databases and modeling systems developed by EPA:

U.S. Environmental Protection Agency
EPA HQ Library PM-211A
Washington, D.C. 20460

File Name	Code in Guide	Coverage	File #
Information Systems Inventory	(ISI)	1986 update	--

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